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ABSTRACT

This document contains five papers on vocational education. "Access to a High School General Curriculum Based on Integration of Academic and Occupational Learning: A Case Study" (Laura T. Eisenman, Dontae Wilson) examines the access of secondary special needs students to general education. The school-to-work movement (STW) and the role of research in creating a model STW system are discussed in "School-to-Work: Where Are We, What Do We Know, Where Are We Going?" (William J. Stull, Nicholas M. Sanders). "Implementation of a Model for Strategic Planning in a Regional Technical Education Center" (Barbara Tansey, Bob R. Stewart) reports a study designed to develop a community-based strategic planning model for use in regional vocational-technical education centers. "The Effectiveness of Computer-Assisted Instruction in Technical Education and Training" (Curtis R. Finch, Mohammad Naim Yaakub) is a quantitative analysis of contemporary individual studies of computer-assisted instruction. The perceptions of district vocational directors and high school building administrators concerning vocational educators' willingness to make changes in their programs are compared in "Attitudes of Vocational Educators toward Change" (Hollie Thomas, Mark Schmidt). (MN)

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AERA

Vocational Education
Special Interest Group

1999
Proceedings

American Educational Research Association

1999 Annual Meeting
Montreal, Canada

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AERA

Vocational Education

Special Interest Group

1999 Proceedings

American Educational Research Association

1999 Annual Meeting
Montreal, Canada

April 19 - 23, 1999

Allen D.Truell
University of Missouri-Columbia
SIG Program Chair and Proceedings Editor

NOTES FROM THE SIG PROGRAM CHAIR

The 1999 American Educational Research Association (AERA) annual meeting was held in Montreal, Canada, April 19 - 23. The theme for the AERA conference was "On the Threshold of the 21st Century: Challenges and Opportunities." The Vocational Education Special Interest Group (SIG) had two paper sessions, one roundtable session, and a business meeting during the AERA annual meeting.

Each paper and roundtable presented during the Vocational Education SIG sessions was selected through a blind, peer refereed process. Each paper and roundtable proposal was read by three reviewers.

Inclusion of the papers in the Conference Proceedings does not preclude the submission of the papers to any refereed journals. A copy of the SIG program agenda is provided on the following pages. The papers included in the Proceedings were submitted within the designated time frame provided to each of the presenters.

Allen D. Truell, Ph.D.
Vocational Education SIG
Program Chair and Proceedings Editor

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Vocational Education SIG Program

1999 AERA Annual Meeting
Montreal, Canada
April 19 - 23, 1999

Monday, April 19, 1999

Session Title: Vocational Education SIG Business Meeting
Session Number: 8.07
Location: Hilton, Pointe aux Trembles, Banq Fl
Time: 6:15 - 7:45 am

President: Hollie B. Thomas, Florida State University
Program Chair: Allen D. Truell, University of Missouri, Columbia
Secretary: Bob R. Stewart, University of Missouri, Columbia

Tuesday, April 20, 1999

Roundtable Session

Session Title: Critical Issues in Vocational Education
Session Number: 12.06
Location: Hilton, Fontaine B, Level F
Time: 9:35 - 10:15 am

Table 31: *What Adolescents Learning Working in Fast Food Restaurants.*

James R. Stone, III, University of Minnesota
Theodore Lewis, University of Minnesota

Table 32: *Short-Term Impact of an Integrated Lesson on Students' Learning and Motivation.*

Rita Hemsley, University of California, Riverside

Table 33: *Educational Issues via the Web.*

Diane H. Jackman, North Dakota State University
Michael K. Swan, Washington State University

Table 34: *The Impact of Job Quality on Negative Work Attitudes and Behavior of In-School Adolescents.*

Baraath Josiam, University of Wisconsin-Stout
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Table 35: *Factors Leading to the Retention of African American Students and Non-Minority Students in Business Programs at a Northwest Florida Community College.*

Lonnie J. Echternacht, University of Missouri-Columbia
Joyce M. Hopson, Pensacola Junior College

Table 36: *Problem Based versus Objective Exams: Final Performance of Vocational Career Center Students in Accounting 1.*

Conda Davidson, University of Missouri-Columbia
Linda Webster, University of Missouri-Columbia
Allen D. Truell, University of Missouri-Columbia

Wednesday, April 21, 1999

Paper Session

Session Title: Program Planning in Vocational Education
Session Number: 25.11
Location: Hilton, Longueuil, Banq Fl
Time: 10:35 - 12:05 pm

Chair: Allen D.Truell, University of Missouri-Columbia

A Model for Strategic Planning in a Regional Technical Education Center.

Bob R.Stewart, University of Missouri
Barbara Tansey, Nova Group

The Effectiveness of Computer-Assisted Instruction in Technical Education and Training.

Curtis R. Finch, Virginia Polytechnic Institute and State University
Mohammad Yaakub, Institut Teknologi Tun Hussein Onn

How Tech Prep/School-to-Work Affects Students.

Debra D. Bragg, University of Illinois-Champaign
Carolyn J. Dornsife, University of California-Berkeley

Attitudes of Vocational Educators Toward Change.

Hollie B. Thomas, Florida State University
Mark Schmidt, North Dakota State University

Thursday, April 22, 1999

Paper Session

Session Title: The Role of Vocational Education in Workforce Preparation
Session Number: 36.59
Location: Marriott, Maisonneuve B, 36th Fl
Time: 10:35 - 12:05 pm

Chair: Ken Martin, University of Cincinnati

Integrating Academic and Occupational Learning: A General Curriculum for Secondary Students with Disabilities.

Laura T. Eiseman, University of Delaware
Dontae Wilson, University of Delaware

Raising the Stakes: Funding Labor Market Effectiveness in Missouri's Area Vocational-Technical Schools.

Mark Ehlert, University of Missouri-Columbia
Bob R. Stewart, University of Missouri-Columbia

Youth Apprentices in College: Access, Persistence, and Achievement.

Allen L. Phelps, University of Wisconsin-Madison
Karen Knox, Blackhawk Technical College

School-to-Work: Where We Are, What We Know, Where Are We Going?

William J. Stull, Temple University
Nicholas M. Sanders, Temple University

ACCESS TO A HIGH SCHOOL GENERAL CURRICULUM BASED ON INTEGRATION OF ACADEMIC AND OCCUPATIONAL LEARNING: A CASE STUDY

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Assistant Professor
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Delaware

Dontae Wilson
Research Assistant
University of

Introduction

Recent amendments to the Individuals with Disabilities Education Act (1997), require that students with special education needs have access to the general curriculum within a school. At the elementary school level, the general curriculum is relatively easy to define and consists primarily of instruction in basic academic skills of reading, writing, and mathematics. However, as students progress through middle school and into high school settings, defining the general curriculum becomes more difficult. There is a shift from learning basic skills to using those skills to acquire content knowledge. Further, a typical high school may offer several levels and varieties of academic and vocational content, or students may be required to choose among curriculum paths. Even when curricular choices are more limited, acquiring secondary level content in concert with their peers is difficult for many students with special education needs because their basic academic skills may be significantly below grade level. The gap in academic achievement levels between students with and without special education needs often means that students with special education needs require continued instruction in basic academic skills. Additionally, students with special education needs may require instruction in specialized content, such as learning strategies and daily living skills, that is of less concern to their peers. Therefore, the curriculum for secondary students with special education needs may of necessity look very different than the curriculum experienced by other secondary students.

General and vocational educators also have expressed concerns about the nature of secondary curricula for many typical students. The traditional college preparatory curriculum found in most high schools is not designed for and does not recognize the fact that the majority of students choose to enter the workforce directly from high school. Further, with many states increasing academic course requirements to meet public demands for higher academic standards, high school students have fewer opportunities to enroll in traditional vocational course work that might prepare them for skilled work. At the same time, labor market demands for technically skilled workers have increased as information and service-oriented industries have grown. A response to this dilemma has been the suggestion that secondary schools should integrate academic and occupational learning within systems designed to prepare all students for further postsecondary education and employment (Grubb, Davis, Lum, Plihal, & Morgaine, 1991; School-to-Work Opportunities Act, 1994). Legislative initiatives, such as the School-to-Work Opportunities Act (1994) and the Carl D. Perkins Act (1990) have supported integrated curricula and have suggested that all students would benefit from such. The special

education field also supports comprehensive curricula that include academic and occupational learning. however. concerns remain regarding whether general education school-to-work programs can be designed that adequately serve students with special education needs (Halpern. 1994; Benz & Kocchar. 1996). The possibility and suitability of an integrated academic and occupational approach as a general curriculum for students with special education needs must be examined.

In practice. the integration of academic and occupational learning takes many forms depending on the goals and resources of the implementers (Grubb et al., 1991; Plihal. Johnson. Bentley. Morgaine. & Liang. 1992. Reid & Tsuzuki. 1994). At the simplest level. integration may occur when an individual academic teacher decides to infuse illustrations and problems from the world of work into classroom activities. At this classroom level. integration is made visible in activities that make explicit connections between school and work. emphasize general work-related skills such as problem-solving and working with others. and provide more frequent opportunities for hands on or applied work (Adelman. 1989; Eisenman. 1998). At more complex levels. integration may involve whole school reforms. such as the creation of career academies in which all students engage in a sequence of aligned academic and occupational experiences relating to a particular industry. There are numerous descriptions of model programs that integrate academic and occupational curricula for students with or without disabilities (Plihal et al., 1992; Stasz. Kaganoff. & Eden. 1994). However. there is little information on how integrated programs are actually implemented at the classroom level (Grubb. 1997). Further. there are few descriptions of programs designed for both groups (Eisenman. 1998; Hernandez-Gantes. Phelps. Jones. & Holub.1995). Therefore. identifying and exploring examples of the intersection of integrated academic/vocational curricula and special education practice would provide opportunities to conduct two important tasks: expanding the research base on classroom practices related to integrated curricula. and testing propositions regarding the suitability of integrated curricula as a context within which students with special education needs may access general curricula. The purpose of this case study was to extend the research literature and inform practice by examining an illustrative case of implementation of integrated curricula for students with disabilities within a program designed to serve all students.

Methods

Through case study research an investigator seeks to describe. explore. or explain the boundaries of an existing phenomenon within its natural context (Hamel. Dufour. & Fortin. 1993; Stake. 1994; Yin. 1994). This "casing" process is dependent upon making plain that the identified case represents the phenomenon of interest (Ragin. 1992). This may be done by documenting sampling strategies and contextual issues. displaying the researcher's conceptual frameworks. and employing methodological rigor that enhances the credibility of the case description (Hamel et al., 1993; LeCompte & Preissle. 1993).

Case Selection and Context

The selected case was an urban vocational-technical high school that within the last several years had earned a positive reputation among other educators in the state for implementing an innovative program including integrated curricula. The school also tended to serve a slightly higher proportion of students with mild cognitive disabilities than other local vocational schools. For these reasons, the school principal had been invited to present an overview of the school's programs to a state transition services advisory committee, of which the first author was a member. Initial contact with the school for purposes of proposing this study was made through the principal by the first author following the principal's presentation. Following a meeting with the principal and first author, staff agreed to participate. The principal and special education coordinator identified teachers and other administrators who could serve as informants about the school's academic, vocational, and special education activities. The principal also provided documents about the school's history and recent initiatives.

McCoy High School of Technology is situated within an old neighborhood of rowhouses and small businesses in a city with a population under 100,000. The school is within two blocks of large corporation buildings that mark the edge of the city's central business district. The school, originally founded in the late 1800s, was the first public high school in the state for African-Americans. It was desegregated in the 1950s. Part of the school is now housed in a structure built in the 1920s: a brick, multi-story arrangement of classrooms and long hallways around a central auditorium. A plaque noting the historical significance of the school stands upon a post near the entrance to the this building. In the mid 1970s a second two-story building designed for vocational training was added to the campus. An enclosed pedestrian bridge connects the older building to the newer one. The vocational building is comprised of large open shop areas on both floors. Classroom space is built into some shop areas. Outside the shop areas, classrooms may be single rooms off hallways or clusters of rooms connected to each other by common space, doors or halls. The library, cafeteria, main office and guidance office are housed in the newer building. An open concrete and brick courtyard, which serves mainly as an entry and exit point for students at the beginning and end of the school day, lies between the two buildings. Today the school serves approximately 650 students, of whom approximately 60% are African-American and 40% are white. Students with special education needs comprise 15% of the student body. The majority of these students with special education needs are classified as having mild cognitive impairments, such as learning disabilities and mental retardation. Students with more severe cognitive disabilities are served at another non-specialized school in the same district.

McCoy is one of three schools within a vocational-technical school district serving students from multiple school districts within its geographic region. In the late 1980s, the vocational-technical school district undertook a review of each school's programs. Administrators and community members participating in that review described McCoy as a school with potential, but in decline: enrollments were decreasing; the school's neighborhood and facilities were seen as uninviting; staff morale and student achievement were low. A task force developed specific recommendations for strengthening leadership, developing programs, facilities improvement, public relations

and marketing. Of the twelve program development recommendations made by the task force, two are of special note as context for this case study. First, the task force recognized McCoy's "quality" special education services and suggested further training for all teachers to promote "staff teaming practices" across general and special education. Second, the task force suggested that the school must improve students' basic academic skills and could do so by requiring academic and vocational teachers to collaborate on developing learning activities. The committee specifically suggested that writing standards should "cut across" all courses and writing should be a "frequent and routine responsibility for students". Shortly after the task force's review, the district hired a new principal to implement these recommendations. By the mid 1990s another district-commissioned task force reviewed the school's progress and noted significant improvements in all areas. The principal, who oversaw this change and served as the first author's primary contact with the school, attributed improvements to the "vision and sheer determination" of the faculty steering committee, its subcommittees, parents, and students.

Initial Questions

Based on our interest in exploring this case as an exemplar of integrated curricula delivered to all students, including those with special education needs, we began with the following questions to frame our investigation. How do administrators and teachers define integrated curricula in this school? How are integrated academic and occupational curricula implemented in this school, especially for students with special education needs? How does the delivery of integrated curricula in this school correspond to a model of school-to-adult life transition services for students with special education needs?

Data Sources

We began data collection in the late fall, continued through the end of the school year (late spring) and conducted follow-up meetings the next fall. We initially conducted interviews with a district administrator in order to examine and develop understanding of contextual issues from a perspective outside the school. We followed this with multiple classroom observations in order to compare and contrast what we had learned from administrators with observable practice. During observations, we made running chronological notes regarding the physical space, individuals present, and activities. Following initial administrator interviews and classroom observations we developed additional questions to guide interviews with teachers and students. Students were selected following nominations from teachers. We asked teachers to identify students with special education needs considered to be highly successful and others considered to be less successful in the school. Our goal was to sample a range of student perspectives. We also secured parent and student consent for participation. Ultimately, three district and school administrators, nine teachers and eight students participated through semi-structured interviews. Field notes and audio tapes were our primary data sources. We generated additional field notes through 27 non-participant observations of classroom activities and review of multiple school documents.

Analyses and Conceptual Frameworks

Data analyses occurred through a repeated process of coding, categorization, and theoretical sampling from notes and documents (Strauss & Corbin, 1990). We used a qualitative data analysis software program to manage data analysis tasks (Qualitative Solutions and Research, 1997). Our primary focus was on student, teacher and administrator interactions observable within the school and reported by participants, however, we also conducted analyses within an ecological framework (Bronfenbrenner, 1977) in order to be sensitive to contextual factors influencing implementation at multiple levels (student, program, organization, and community). Within each level, we looked for evidence of stated goals, intended and actual activities, and documented outcomes. We used this three-part framework during our analyses as a way to organize the large amount of data generated in regard to implementation. We selected this framework because it highlights major components of program implementation (King, Morris, & Fitz-Gibbon, 1987).

The first author was responsible for conducting initial analyses, and as themes emerged within or across these frameworks, she developed coding memos that summarized her interpretation of the data, discussed revisions to working coding schemes, and included examples drawn from the data. The second author then served as a reviewer by examining coding memos and original field notes to check for inaccuracies and to suggest alternate interpretations. As we encountered discrepancies among reports or observations, identified gaps in our knowledge about the program, or raised new questions through ongoing analysis, we documented and pursued these issues with participants in subsequent interviews, observations, and meetings.

Finally, we compared the identified implementation elements across five domains of a taxonomy of best practices in special education transition that had been validated by a nationwide group of researchers and practitioners (Kohler, 1996). Within each domain, we considered whether examples from the taxonomy matched information in our school documents, interviews and field notes. We considered a taxonomy element to be "strongly evident" at McCoy if most or all of the taxonomy examples were illustrated in our notes. Elements for which we identified at least two examples, were labeled as "evident". If we found no illustrations of the taxonomy examples, then we considered an element to be "not evident".

Subsequently, we developed a case report and tables describing our findings. In the fall of the next school year, we presented the written report and tables to individual participants and invited written and oral feedback. Also, we gave written invitations to participants offering to meet individually with anyone who wanted to share comments. Further, we held a small group meeting at a time when both teachers and students were free in order to share information. Unfortunately, no students offered individual feedback or came to the small group meeting. However, teachers and administrators did provide corrections and alternate interpretations through the small group meeting. We made corrections, considered other perspectives, and wove these into the final case report. We completed these member checking activities as a means of soliciting comments from

participants regarding the accuracy and clarity of the report and to serve as a vehicle for asking additional questions about the case. Finally, to further enhance credibility of the case report, we created an audit trail by supporting quotes and assertions in the case report with citations referencing our data indexing system. To improve readability, we created a second version of the final case report that was the same in all regards except for removal of index citations.

Findings

How do teachers and administrators in this school define integrated curricula?

When asked to define integrated curricula, teachers and administrators focused on characteristics of integration evident in a specific program and individual teacher actions. Participants depicted the Quest for Quality program (described in detail below) as a mechanism for helping students reflect on, express, and document the link between academic and vocational work. Participants also suggested that integration occurred when individual teachers explicitly discussed and provided examples of academic demands that exist in the work world. Participants further defined integration as activities that require students to ask themselves how skills they learn in school relate to their preferred future lives and occupations.

One administrator defined integration of academic and occupational curricula as "making the link between the two for the students - helping them see that they really can't be separated these days" and providing activities that make students ask "how do academic and vocational fit together?". A teacher said that in his vocational shop "all subject matter taught [requires] students to use skills needed for real job situations - for example, they repair a job, and they must fill out a bill and write a manager's evaluation form up. The nature of the field [leads] to constant higher level (thinking) skills and problem solving". Another teacher noted that "the main projects for graduation are an integral part of what [students] do in shop. During the senior year, the students are asked [through a senior project] to think about what you'll be doing with the skills you learned at school". Thus, teachers and administrators defined integrated curricula as activities that required students to learn academic and vocational skills in tandem and to connect those skills to a larger context - their personal lives and post-school goals.

How are integrated academic and occupational curricula implemented in this school, especially for students with special education needs?

Goals

Teachers expressed their desire to create a flexible, caring learning environment where students "don't get lost in the shuffle". They wanted to be seen as a school that gives students a quality academic and technical education leading to student choices among career paths. One teacher hoped that the school would be seen as a "choice" school - one with which parents and students would want to be associated. Another teacher believed that the school embodied a "community tradition"; that is, as a small, long-established, center-city school many parents wanted to send their children to the same school one they themselves had attended.

Teachers consistently expressed that the school's goals were to provide all students with technological skills and prepare them for higher education and employment. They believed the school offered a quality education because it was strong in both academic and vocational curricula. One teacher called this "the best of both worlds". A special education teacher said school staff want "all students to become employed or go to college", and they want to "make students more technologically-trained - get away from traditional vocations". Teachers believed the school curricula offer students the choice to go to college or become employed immediately. "[A student] can make choices of choices".

Long term goals mentioned by teachers included preparing students to be good citizens and productive members of the community. Teachers also emphasized the goals of teaching all students personal and employability skills needed for surviving "real life experiences". Some teachers had immediate goals of helping some students who received special education services to meet the district's requirement to pass Algebra I and to stay in school long enough to graduate. The district demands that special education students meet the same diploma requirements as other students. These requirements are meant to support the state's recent initiative to institute an accountability system that includes standards-based assessments, which all students must pass in order to graduate with a diploma.

Activities

Teachers and administrators suggested that implementation was accomplished through experimenting with alternative deployment of human, time, and material resources. Academic, vocational and special education teachers frequently mentioned collaboration as an important example of using resources to promote integration of academic and occupational curricula.

Collaboration. Teachers collaborated informally around individual students' needs. For example, if some task in vocational class required writing, and this was an area of difficulty for a particular student, then the vocational teacher called upon an academic teacher for assistance. One teacher said he encouraged the students to see the discipline areas taking supportive roles for each other. If there's a question he can't answer, he will send the student to another teacher as a resource. Sometimes, an academic and vocational teacher get together in order to discuss the knowledge and skills that are needed in both their classes. A vocational teacher described this type of collaboration as "going both ways". He noted that in shop he incorporates "constant" writing such as time sheets and trip reports. He and an English teacher jointly grade some shop reports and projects. He checks content. The English teacher checks grammar. Further, teachers and administrators mentioned "integration projects" as important examples of collaboration. Teams of teachers develop proposals for innovative projects that integrate curricula and submit these to the district for funding. After project completion, teachers report their results to a district evaluation committee. Teachers involved in the three top scoring projects each year receive additional funding to present

their projects at professional conferences. One integration project for 10th grade students was entitled "The House That McCoy Built: An Integration of Academic, Vocational, and Employability Skills". Students were to create and build a house to scale. In the first phase of the project, the students designed the house and made a list of needed materials. The next phase included ordering materials, developing a site, framing, and constructing. The students also visited a housing manufacturer to observe specific construction processes. Housing industry professionals and the students themselves evaluated student performance on: completion of the house, written and oral communication skills, accuracy of mathematical computations and measurements, and application of principles of technology.

Support for collaboration. In addition to district support of the integration projects, teachers and administrators reported that the district showed that it valued collaboration by creating many opportunities for teacher training at which academic, vocational and special education teachers were present. For example, an administrator noted that all teachers received training on principles of technology, algebra instruction, and accommodations for students with special needs. Further, special education teachers were assigned to academic departments and expected to become content specialists as well as special educators.

Teachers believed that informal and formal collaborative activities were possible because the school was relatively small, provided support staff, and extended instructional and planning time. The school enrollment is approximately 650. On average, teacher-student ratios are 1:30 in vocational, 1:28 in academic and 1:15 in special education classes. The school has a coordinator for work-based cooperative education activities and a job coach who does job development and placement for students with special education needs. Aides are available in the special education resource rooms, and the school shares a speech-language therapist and school psychologist with other district schools. Teachers and administrators also expressed hope that the increasing availability of assistive technology and computers would support efforts to include all students in the regular curriculum. When possible within scheduling demands, special education and academic teachers team teach. Block scheduling is in place, and teachers sometimes organized the available instruction time within a block to suit specific project needs or to team teach. Block scheduling also provided longer teacher planning periods.

Conveying performance expectations. Consistent with their stated goals, we observed staff conveying positive expectations for student performance. School staff told us they expected students with and without disabilities to participate in a "regular" and challenging curriculum. The school's academic, group interaction, and personal skills standards were posted in every classroom. Many teachers had personalized posters or bulletin boards that highlighted specific performance expectations. Several vocational classes posted lists of competencies demonstrated by each student. One classroom had a "Door of Accomplishments" highlighting extracurricular achievements of individual students, including the first-ever honor roll certificate for a student with special education needs. Senior co-op posters spelled out expectations for maintaining work schedules and class work. One teacher, reacting to some students with special education needs using

their disabilities as reasons for not attempting work, made a "zero excuse environment" poster in his classroom. He explained that he tells students "we'll work with you, whatever your disability or problem, if you'll figure out how to work with yourself".

Despite consistent emphasis on performance expectations, we noticed that notions of regular and challenging curricula varied among teachers and students. Several academic and vocational teachers talked about seeing the special education students as "just students", who like any other student might need special assistance in specific areas and should meet the school's performance expectations. However, special education teachers had mixed feelings about the implications of participation in the regular curriculum. One said that some students in her resource room were "bright enough" to be mainstreamed in academic classes, but due to disruptive classroom behaviors they had fallen too far behind to cover all the required content before the end of the school year. Because some were seniors, the teacher was reluctant to have them return to the "regular" class for fear they would not be able to catch up, would fail the class, and therefore, not graduate with a diploma. A teacher also felt that the number of required projects was too demanding for some students given their need for extra preparation and work time in some content areas. Another source of concern for some teachers was the difficulty they experienced balancing district and state requirements to address academic content standards with their desire to explore content in depth, develop more integrated collaborative activities, or incorporate more life skills activities, such as budgeting, banking, or shopping. Some students saw their shops as more challenging than their academic work and expressed frustration with their need for continuing instruction on some basic skills.

Personal connections. During interviews, teachers mentioned their desire to make school relevant for students. Observations of teacher-student interactions in the classroom and student interviews suggested that in practice this occurred through teachers showing or talking about the connection between academics and vocational areas and by teachers appealing to students' personal needs and goals. Teachers provided opportunities for students to experience the use of academics in ways that were personally rewarding. Sometimes this meant meeting students' short term needs (e.g., solving a problem in shop, having a feeling of accomplishment). At other times, teachers appealed to students' long term goals of getting a job or otherwise being successful adults. Students noted that some teachers gave them classroom activities that were similar to what they would need to do in a real job, and sometimes, academic teachers used materials or problems from the students' shops. During conversations with students about these types of activities, some students commented that they knew education is needed to get a job, and they thought math and science were especially important. Other students thought it might be important for them to have good academic skills because "you use math everyday of your life at home, in stores, when you cook". Some thought academics might even be important later when they were parents. For example, one student thought that knowing American history might not be important in her job, but she would want to be able to help her children with their school studies.

While analyzing the various activities used to explicitly integrate academic and occupational curricula for students with special educational needs, we noted that teachers and students made use of formal program structures and teacher-selected instructional approaches. Formal program structures were designed by school administrators, teachers and other staff to meet specific program or district goals and were implemented school-wide. Teacher-selected instructional approaches included a wide range of instructional and content adaptations that individual teachers used as needed to assist specific students' learning.

Formal structures. A central element of the school's efforts to integrate academic and occupational curricula is its Quest for Quality program. Administrators and teachers started the Quest program in the 1990-91 school year as part of the school's efforts to improve services to students. All students participate in Quest, which is comprised of sequential school- and work-based activities coordinated across grade levels (see Table 1). At least monthly, students are provided time within their shops to document Quest for Quality and other school activities in their individual "Quest books". Ninth graders work on their Quest books daily. A graphic on each book cover depicts elements leading to future success: academic achievement, employability skills, critical thinking, and self-assessment. The Quest books are portfolios documenting students' efforts, growth, and accomplishments from ninth grade through graduation. A student and teacher share responsibility for monitoring the completeness of an individual student's Quest book. The books are publicly displayed when a ninth grader makes a "vision statement" presentation, during the senior project presentation, and whenever the student has a job interview.

Table 1. Quest for Quality Program

Freshmen
* Receive a 100-page student performance guide upon entering ninth grade
* Complete an exploratory cycle of vocational classes
* Develop realistic short and long term goals
* Present vision statement, Quest Book and technical demonstration to teachers, administrators, parents, and local employers

Sophomores
* Complete at least two job-shadow experiences in their desired field
* Complete at least two interviews with employers in their desired field
* Complete related academic and career exploration assignments
* Write professional thank-you letters to employers

Juniors
* Complete a 20 - 40 hour unpaid practicum
* Complete related academic and career exploration assignments
* Maintain journal during practicum

Seniors
* Research and present a solution to a problem related to their career area
* Participate in paid co-op work experience (with minimum 2.0 gpa)
* Present case study with proposed solution, Quest Book and resume to teachers, administrators and local employers

The individual ninth grade presentations follow a standard format: student's welcome and introduction, highlights of the vision statement, student comments on his/her Quest book, display and explanation of selected best works, and demonstration of a shop tool or procedure. During the demonstration and following the presentation, audience members are permitted to ask questions. They may ask a student to explain a procedure in more detail or ask a student how he/she would approach a particular problem related to the demonstration. Students often are asked to identify an area in which they would like to improve, and the audience often remarks on their expectations for the students' success and offers suggestions on how the student might meet a stated goal. Each audience member completes a form indicating ratings given to the student for appearance, proper posture, eye contact, communication skills, and the visual component (book and demonstration). The vision statement presentations are held in a class or conference room. The student typically stands in front of a half podium perched on a table or at the head of a conference table. The students typically wear business-like attire: dress slacks and white shirts with ties for the boys; dresses or coordinated slacks and blouses for the girls.

Like the freshman vision statement presentations, senior presentations follow a prescribed format: introduce yourself; present a case study to every panel member; explain your career choice and the problem in the case study that you have been assigned; present the problem; demonstrate the visuals; discuss and justify your solution to the problem; entertain questions; thank everyone. Students develop and practice presentations with their English and shop teachers. The audience is comprised minimally of the career area teacher, administrator, and a local employer. Each audience member evaluates presentations on these components: demonstrates technical competencies and uses correct terminology; presents a complete, professional Quest Book; presents an updated resume and demonstrates professional appearance; demonstrates effective communication skills (eye contact, voice, posture, mannerisms) and responds to questions with complete, logical answers.

Other formal structures. In addition to Quest for Quality, the school has created other program structures to support implementation of integrated curricula, especially for students with special education needs. For example, each summer the school sends teachers and administrators to the homes of each incoming ninth grader. The purpose of the home visits is to answer any questions the family may have about the school and to establish personal contacts between the school and the students' homes. Further, during the school year all students may receive tutoring from a teacher on Saturdays or twice a week immediately after school. Students having difficulty in a course, may be required to receive tutoring. Students classified for special education may participate in academic resource room classes, or academic and special education teachers may team teach. Some students may access a differentiated shop curriculum and still earn a high school diploma. For example, a student with special educational needs who is interested in nursing, but may not be able to complete all technical elements of the nurse technician curriculum, may enroll in the hospital services curriculum. Whether in the nurse tech or hospital

services curriculum, the student would have the same instructor and would complete an approved course of study.

Teacher-selected instructional approaches. Across academic, vocational and special education classes, we observed examples of generally accepted effective instructional practices such as frequent feedback on performance, guided practice on complex tasks, and explicit modeling. For example, during a ninth grade carpentry shop, the teacher congratulated a student on completion of a joint by saying, "That's handshake material!" The teacher then turned to the other students and said, "Carl did a real nice job. He took his time." The teacher then listed the steps Carl had taken to produce the joint and suggested to the students that this was a good way to "get the job done".

In addition to using effective teaching practices, some teachers explicitly capitalized on linkages between academic and occupational content. For example, all students in a senior English class used the Occupational Outlook Handbook as a reference for a personal essay on careers. The same teacher made use of case studies requiring written responses, such as responding to a letter of complaint from a customer. Another academic teacher required students to give oral presentations that incorporated illustrations of how math concepts are used in their shops or specific career areas. A student commented that in her resource room social studies class, students had to solve problems such as establishing a factory in Mexico: "What's the product? What would it cost? What's the market for the product?". In one shop class, students said that the teacher reinforced academic learning by teaching students how to use a torque wrench and a calculator when completing shop assignments or making them calculate customer repair bills.

Outcomes

As part of it's district's data collection efforts, McCoy staff collect and report data each marking period on multiple performance indicators. The district publishes the report and compares each school to a district goal for each indicator; annual trends and highlights are noted. The district does not attempt to attribute performance to a particular set of variables, rather information is to be used by schools' steering committees and department staff as points of discussion when planning curriculum, policies and procedures. The performance report does not disaggregate data for special education students. As of mid-school-year 1997-98, McCoy showed favorable annual trends in several areas. Average daily attendance was up to 94%; above the district goal of 92%. The annualized discipline rates for infractions, suspensions, and detentions continued to decrease (e.g., the annualized suspension rate was 0.17; half the rate of the previous year). The academic grade point average increased in the last three years from 2.08 to 2.31, while the career program grade point averaged increased from 2.53 to 2.72. Ninety-six percent of all co-op students were placed in jobs related to their career interests. Enrollment increased over the last three years from 587 students to 647. The school performance report noted that 0 students dropped out in the last two years; however, it is important to note that a student who returns to a comprehensive high school or enrolls in adult education is not counted as a drop out. Yet, the report also suggests that the net loss

in enrollment from the beginning of the school year is minimal (less than 2% in the preceding two years). The school's job coach reported that 12 of 15 seniors with special educational needs were participating in worksite co-op placements at 10 different businesses in the community. An administrator also noted that 2 students with special education needs returned to their home school the prior school year and none dropped out.

The district also completes a graduate follow-up survey. Each graduating class is surveyed in the fall of each year for three years to determine employment and postsecondary education status and satisfaction with high school experience. The district uses the follow-up survey data for multiple purposes, including evaluating and comparing schools, informing program development and market planning, and showing continued interest in graduates. Overall, McCoy's students who graduated in 1997 were employed (54%) and/or enrolled in postsecondary education (64%). Six percent had enlisted in military service. Eleven percent were not employed, but ten percent reported they were actively seeking employment. Disaggregated data on students with special education needs for the same timeframe were not available at the time of this study, however district-level information was available for those who graduated between 1993-95 and were surveyed in 1997. The district contacted 94 students who had received special education services and, of those, 79% were employed and 34% continued into postsecondary education.

Teachers and students claimed that the benefits of integrating academic and occupational curricula were evident in the students' skill development and increased motivation. To us as outside observers, the most obvious illustration of these outcomes was the students' Quest books, especially the ninth grade vision statement and senior project presentations. Because students selected and discussed their "best works" as a standard part of the presentation, student achievement and pride were ritually displayed. Students shared awards for perfect attendance, honor roll certificates, report cards, essays on prized possessions, letters of commendation from teachers and employers, tests and essays on which they earned high scores, items they'd made, technical procedures they'd learned. Every student shared at least two items during presentations. Requests to look at Quest books, regardless of student grade-level, typically led to the student or teacher pointing out documentation of the student's "best works".

How does delivery of integrated curricula in this school correspond to a model of school-to-adult life transition services for students with special education needs?

Initially, we were able to find examples of all but one element within the taxonomy. Family training was not evident through our observations and interview notes. However, through participant feedback we received examples of multiple activities that matched this element, such as family training sessions on computer literacy, dealing with adolescent behavior, and promoting study skills. Table 2 depicts McCoy's strengths on elements of the transition taxonomy. As we examined our notes, we discovered that some example of goals and activities at McCoy did not fit well into the taxonomy outline. This was most apparent for goals and activities relating to academic achievement. Developing

academic skills was an explicit goal reinforced through numerous activities at McCoy. However, academic achievement is less explicitly emphasized in the transition taxonomy.

Table 2. Transition Taxonomy Elements Evident at McCoy

Domain	Strongly Evident	Evident
Student Development	Career/vocational curricula; Support services; Structured work experience; Employment skills training	Life skills instruction; Assessment
Program Structure	Program philosophy; Resource allocation; Human resource development	Program policy; Program evaluation; Strategic planning
Student-focused Planning	Planning strategies;	Student participation; Individual Education Program development
Interagency		Collaborative service delivery; collaborative framework
Family Involvement		Involvement; Empowerment; Training

Discussion

This study extends the literature on implementation of school-to-work transition services by explicitly examining how secondary students with special education needs were served within a general curriculum focused on integration of academic and occupational learning. School-to-work systems must be designed to provide opportunities for integrated academic and occupational learning for all students, including those with disabilities. Although there are numerous models for delivering integrated curricula, previous studies of integrated academic/ occupational learning provided limited information about how students with special education needs may be involved or benefit from these various approaches. Additionally, we examined these general education practices through a special education conceptual framework and taxonomy. Thus, we considered how curricular and instructional practices deemed critical to successful outcomes for students with special education needs can be incorporated into a general curriculum for typical students. Knowledge of practices that promote access to general curricula is required in order to fulfill the mandates of IDEA and to support educators' efforts to ensure meaningful participation of students with special education needs in typical secondary school settings.

Further, by examining specific classroom practices within the context of program level variables, we provided an illustrative case that will be useful to readers when considering which elements may be transferable to other situations. It is important to note that the findings from this case were not intended to be wholly generalizable to other schools; nor does this case represent the only or best way to deliver integrated curricula. Rather, we intended to present an interesting exemplar in order to provide additional insights into factors influencing development and implementation of programs for students with and without special education needs. We recognize this case study would

have been further enhanced by securing student participant and additional peer reviewer feedback on the draft case report. However, we believe the case report's credibility and dependability are strong. We collected data from multiple sources using multiple overlapping methods over time to confirm information. We examined data within multiple frameworks in order to assess alternate explanations of patterns of information. Further, we received and incorporated participant feedback into the case report.

Summary of Critical Case Elements

In this school, administrators, teachers, and students made the integrated nature of their curriculum explicit. The school provided multiple opportunities, through formal and informal structures, for students to experience and reflect on the link, not only between academic and vocational curricula, but also between school, work, and their future lives. We learned that the teachers and administrators shared a commitment to prepare students for both higher education and employment. This commitment was embedded within a vision of all students as learners with unique needs. This school implemented integrated curricula using several methods highlighted by Grubb et al. (1991) in a discussion of integrated program models. First, the school was organized as an occupational high school providing access to multiple career areas, within which academic requirements for graduation were stressed. Second, it aligned academic and vocational curricula across disciplines and across grade levels. Alignment was accomplished through teacher collaboration around specific courses or projects and through the Quest for Quality program. Third, it required senior projects as a culmination to the program of study. Implementation of these formal and informal program structures was supported by staff training, incentives, and creating opportunities for collaboration across disciplines. We noted that these activities corresponded to a special education taxonomy of desirable transition practices (Kohler, 1996). Specifically, there was evidence of a comprehensive approach to student development (i.e., access to a variety of curriculum options and supports), a philosophy of educating all students to be productive members of the community, and significant investments in human resource development and allocation. It is important to note that students with special education needs in this school had access to specialized instruction and accommodations when participating in typical settings. Previous studies suggest that accommodations and specialized instruction needed by some students may be lacking in typical mainstream vocational and academic classes (Baker & Zigmond, 1990; Benz & Halpern, 1993; Wagner, 1990). The findings suggest that this case reflects many features of successful career and transition-oriented secondary programs in both general and special education and does so in a way that is valued by students with diverse needs (Charner, 1995; Hernandez-Gantes et al., 1995; Kohler, 1996; Phelps, Hernandez-Gantes, Jones, Sanchez, & Nieri, 1995).

Implications for Practice and Future Research

The type of general curriculum delivered by this school may lead to important benefits for individual students with special education needs. Previous outcome studies point to the positive relationship between vocational experiences in high school and later employment for students with special education needs (Kohler, 1993; Wagner, 1991). In

itself, the fact that this school ensures delivery of comprehensive vocational experiences to students with special education needs is encouraging news given the gap between vocational preparation needed and received by such students (Benz & Halpern, 1993). There are other potential benefits to be highlighted as well. First, an orientation toward promoting student choice is built into the curriculum. Students are given opportunities to explore various careers. Students are encouraged to set long term and short term goals related to their career interests. Students are encouraged to consider both college and work as possible outcomes of their high school experience. The teachers at this school believed that exposure to both academics and vocational options along with the opportunity to learn a specific set of marketable skills would give students more options once they left school. This de-emphasis on tracking students into college-bound and non-college-bound career paths through an integration of academic and occupational learning is an advantage of school-to-work reforms over more traditional high school programs (Oakes, Selvin, Karoly, & Guiton, 1992; Stern, Finkelstein, Stone, Latting, & Dornsife, 1994). Follow-along studies of the postsecondary experiences of high school students who experienced integrated curricula would provide additional insight into whether students perceive and act on these available choices in a way that leads to improved outcomes in employment and higher education.

Another potential benefit may result form the school's structured process for assisting students to explore interests and strengths, establish education and career goals, and document activities that lead to those goals. This structured process may support increased levels of student's self-determination. Such an outcome is an important goal of secondary special education programs (Field, Martin, Miller, Ward, & Wehmeyer, 1998). Self-determination is a set of "skills, knowledge, and beliefs that enable a person to engage in goal-directed, self-regulated, autonomous behavior. An understanding of one's strengths and limitations together with a belief in oneself as capable and effective are essential to self-determination" (Field et al., 1998). Initial research indicates that students who possess higher levels of self-determination are more likely to experience success in adult roles (Wehmeyer & Schwartz, 1997). The possibility that quality career education programs may promote self-determination among students with special education needs merits further investigation (Wehmeyer, 1995).

Further, this type of program may contribute to increased persistence in school. The fact that students with special education needs are significantly more likely than their peers to drop out is well-established and continues to be of concern (Wagner 1991). Previous research on drop out prevention programs suggest that students are more likely to persist in school when their academic, vocational, counseling, and social support needs are met (Lichtenstein, 1992; Rossi, 1995). Programs focusing on any one element without addressing others typically are less successful. Given the method of tracking numbers of drop outs at this school, it is not possible to clearly establish whether the school's efforts were paying off in terms of keeping students in school. A further complication is the fact that students must apply to the school; thus, introducing some selection bias. Students must be motivated to consider a vocationally-oriented high school as an option, and the school has some control over who may enter. Again, much could be learned from follow-along studies contrasting the experiences and outcomes of students in career-

oriented programs, those who opt out, and those who are denied admission to such programs. In this case, it is worth noting that the school's comprehensive approach is aligned with practices known to promote student persistence, and the school is able to deliver these services within a framework designed for typical students.

This school met multiple goals of secondary special education because the district and the school invested in supporting collaboration across general, special, and vocational education and across academic disciplines. Underlying this collaboration was the idea that a quality academic program and special education services were critical components of successful reform for the school as a whole. It is possible to see this case as illustrative of key factors that support sustainable organizational change in schools: broad stakeholder ownership of issues, a problem-solving approach supported by training, and regular outcome measurement (Phelps, 1997). Research into factors or conditions that lead districts and schools to adopt a collaborative, problem-solving approach would be helpful to educators seeking to initiate inclusive reforms.

In conclusion, findings from this case study suggest the availability of a solution to the problem of meeting diverse goals of secondary education for students with special education needs. This school's curriculum was structured to provide academic preparation in line with increased district and state performance requirements as well as career exploration and preparation. Academic and vocational curricula were supported with specialized instruction and accommodations to enable access by students with special needs. This is not a full inclusion model, under which separate classrooms might have been eliminated. Some student's at this school received some academic instruction in specialized classrooms. It is a case where the emphasis is on what all students are expected to learn, rather than on the place where the instruction is received; thus avoiding a common pitfall of secondary special education programming (Edgar & Polloway, 1994). Interestingly, because the general curriculum demands exposure to work environments, the notion of where instruction can occur is expanded beyond traditional debates about specialized and non-specialized environments. Ultimately, all students must learn the skills that will allow them to be successful in work environments.

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SCHOOL-TO-WORK: WHERE ARE WE, WHAT DO WE KNOW, WHERE ARE WE GOING?

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Introduction

Over the past decade schools across the country have established programs aimed at easing the transition from school to the workplace for their students. The origins of this movement lie in the changing structure of the U.S. economy. The "Old Economy" of earlier decades has been superseded by the more competitive, global, technology driven, and volatile "New Economy" of the 1990s (Research and Policy Committee of the Committee for Economic Development, 1996). Most of America's political, business, and education leaders now agree that to succeed in this changed environment young people entering the labor force must have broader and deeper skills than those possessed by earlier generations of new workers (Secretary's Commission on Achieving Necessary Skills, 1991).

A series of national research reports beginning in the late 1980s raised serious doubts about the ability of the American education system to provide the required skills to the majority of its students without substantial reform. (See, for example, William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988 and Commission on the Skills of the American Workforce, 1990.) According to these studies, too few students leave school with the academic knowledge, personal qualities, and job specific competencies needed to establish themselves quickly in stable, full-time employment with reasonable earning potential. Those without these skills may flounder for years before finding any career that suits them, and too often the careers in which they end up have limited long run prospects. More recent empirical research on the operation of youth labor markets has provided further support for these conclusions (Gardecki and Neumark, 1995; Klerman and Karoly, 1995). Many writers argue that this lack of fit between the world of school and the world of work jeopardizes not only the economic future of many of our young people but also that of the nation as a whole. The school-to-work (STW) movement is best understood as the education sector's response to these concerns.

The STW Movement

The STW movement is made up of individuals and organizations in the public and private sectors who are working together to bring about a fundamental change in the way the nation both educates its young people and prepares them for the world of work. The beginnings of the movement can be traced back to the mid 1980s when educators and policymakers, perhaps galvanized by the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983), began to develop alternative models of secondary education based on nontraditional pedagogy, contextual learning, learning by

doing, and direct connections between school and work such as those found in other countries (Parnell, 1985; Raizen, 1989; Lerman and Pouncy, 1990; Lave and Wenger, 1991). By the early 1990s a variety of reform efforts had been launched based on these models. These included funding of Tech Prep as part of the Carl A. Perkins Vocational and Applied Technology Education Act of 1990, U.S. Department of Labor support for youth apprenticeship programs, and a broad range of state and local initiatives such as the well-known National Youth Apprenticeship Initiative sponsored by Jobs for the Future, a Boston-based nonprofit organization (Olson,1997; Urquiola et al., 1998). Stull and Stull (1999) in their nationwide sample of high schools found that most were offering a variety of STW program elements by 1992.

The movement culminated in the passage of the School-to-Work Opportunities Act (STWOA) of 1994 (Jennings, 1995). States receive grants under this legislation once they establish a statewide STW partnership which includes representatives from the governor's office, state agencies, business firms, organized labor, nonprofit human service organizations, and the education sector. The statewide partnerships distribute funds to local partnerships, which typically include among their members educators, employers, government officials, and labor union leaders.

Local partnerships then work to establish STW systems in individual schools and districts. The STWOA does not specify in detail what such local systems should look like except that: (1) they must consist of school-based learning, work-based learning, and connecting activities, and (2) they must be sufficiently comprehensive and structured so that participating students can choose among one or more sets of linked school- and work-based learning paths each leading to defined postsecondary education or employment opportunities. Since 1994, all 50 states plus Puerto Rico and the District of Columbia have received STWOA development and implementation grants totaling $835 million. Federal support will cease in 2001 at which time local partnerships, if they are to survive, must have established alternative funding sources.

Within this setting, the purpose of the present paper is to present a synthesis of research on the implementation of STW systems at the school level. The primary focus is on the extent to which (and in what ways) the "model" STW system been established in American high schools. A secondary focus, necessarily more speculative, is on the prospects for further progress. The paper concludes with some tentative observations about the long run future of the STW movement.

The Model STW System

There appears to be substantial agreement among STW advocates about what the model STW system should look like at the level of the individual school, though precise descriptions of such a system are not that easy to find in the literature. The present section describes what appears to be the "consensus" system using the school-based learning, work-based learning, and connecting activities structure embodied in the STWOA. A concise statement of this system is as follows:

A coherent combination of linked school-based learning, work-based learning, and connecting activities for a broad range of students that lead to higher academic achievement and enhanced career skills.

This description is based on the language of the STWOA and an extensive review of the literature. Thus, it does not necessarily reflect the exact views of any single advocate or researcher. In addition, individual writers differ substantially with respect to the relative importance they attach to its different elements, though nearly everyone would include all of them in their ideal system. It is important to note that this description includes both input components (structure, type, and scale of activities) and output components (student outcomes). The remainder of the section will be devoted a discussion of both groups of elements focusing on their definitions and reasons for inclusion.

- Coherent combination of linked activities

A central goal of the STW movement is to provide in every high school an integrated sequence of STW activities that are linked to each other, to the academic curriculum, and to the diverse long term goals of the students. The sequence may encompass preexisting activities such as cooperative education but must extend beyond them to include other program elements. This requirement arises, in part, out of the long term concern of many educators about the lack of connection between academic and vocational programs in the typical comprehensive high school. Most advocates believe that an effective STW system requires that the sequence of activities begin in the freshman year and progress through the senior year. Such a program structure enables the system to have a real impact on the long run learning and decision making of participating students. It also encourages students who might otherwise drop out to stay in school.

- School-based learning activities

School-based learning activities are classroom and nonclassroom activities which link the traditional academic curriculum to the larger world of work in which the students are beginning to participate. These typically include the selection of career majors, courses and strands that connect to particular occupations and industries, career awareness programs, and activities that teach students how to set and achieve realistic long-run personal and career goals.

- Work-based learning activities

Work-based learning activities are designed to give students significant real world work experience and skills and, at the same time, reinforce and motivate their academic studies. They represent a way outside of the conventional school setting to inform students about careers, encourage them to persevere in their education, and help them develop essential skills that will enable them to succeed in the labor market. An ideal program would probably begin with job shadowing for younger students and then move to more intense work experiences for upperclassmen. The latter would be paid for their efforts,

acquire general and specific work skills, and be engaged in work tasks that are closely linked to their academic courses.

- Connecting activities

Connecting activities are the administrative functions, typically taking place in the school, that provide the necessary linkages between the teachers and administrators who are providing the school-based activities and the employers who are providing the work-based activities. They would typically include recruitment of employers and mentors, job development, student placement and monitoring, coordination of school-employer curriculum development, and any other activities needed to strengthen the school-employer collaboration.

- Broad range of students

Initially, the STW movement focused most of its attention on high school students not destined to complete a four year college degree. In recent years, however, there has been a change in thinking on the part of STW proponents. The consensus view now is that most students, perhaps all, should participate significantly in STW programming during high school. The reasons for the change are twofold. First, increasing numbers of secondary education specialists now believe that every student, even those going to top colleges and universities, could benefit from activities that focus on workplace skills and career opportunities. Second, STW advocates have come to recognize that secondary school activities that don't include students going to baccalaureate institutions are likely to be stigmatized as "dumping grounds" for the less able.

- Higher academic achievement

It is widely appreciated in the STW movement that the reforms its advocates are proposing can only be sustained in the long term if they lead to improved student performance in the traditional academic subjects. In part, this is a practical decision based on the belief that most educational institutions (and many parents and taxpayers) are unlikely to support major changes unless they enhance academic performance for at least some students. In addition, however, it can be seen as a response to the increasingly common business perception that traditional vocational education is no longer providing sufficient intellectual preparation for the emerging American workplace.

- Enhanced career skills

In addition to increasing academic achievement, a successful STW system must also contribute to the future labor market success of participating students through the provision of general and specific job skills valued by employers. For most students participation in STW activities will be based on the expectation that these activities will meaningfully enhance future employment prospects. If STW programming is to be successful in the long run, such expectations must be fulfilled. Most STW authors interpret the concept of career skills quite broadly to include both the specific advanced

skills needed for a particular occupation and the general skills needed for all occupations, with the latter generally encompassing work attitudes as well as behaviors.

Status of Current Research

Creating an STW system with the preceding structural characteristics in a significant number of U.S. high schools is an ambitious agenda for a variety of reasons. First, such a system represents a significant deviation from the "shopping mall" approach taken by the typical comprehensive high school with its rigid separation of academic and vocational tracks (Powell, et al., 1985). Second, it requires substantial collaboration between schools and other community organizations, particularly employers, for which there is no strong tradition in most areas. Third, the resources required for full system implementation are substantial and, therefore, not likely to be forthcoming in school districts where education dollars are scarce.

There is also no guarantee that systems with the programmatic and curricular characteristics stressed by STW advocates will produce the desired student outcomes. The theory of learning that underlies STW programming asserts that combining school-based learning with work-based learning will produce a substantial increase in both academic knowledge and career-relevant skill acquisition, in part through improved pedagogy and in part through increased student motivation. While there is some logic to this theory, it is uncertain that STW systems, no matter how well designed and funded, can deliver on the promise of raising both academic and career performance for large numbers of students.

These considerations suggest that it is by no means a foregone conclusion that coherent STW systems will be widely established in American high schools or that once in place they will have an important effect on students' academic and career achievement. We must, therefore, turn to the research literature on STW programming for an objective assessment of the extent to which model STW systems are being put into operation around the country. Such an assessment can, in turn, provide the basis for an informed prediction about the long run impact of the STW movement.

The literature on STW is currently in transition, mainly because many of the programs and activities funded by the STOWA have only recently been established. Three relevant strands of this literature need to be noted. The first seeks to determine the extent of STW implementation in schools across the country. Most of this work is highly anecdotal, focusing on the programs of individual schools and districts. However, a major research grant has been awarded to Mathematica Policy Research, Inc., an economics consulting firm, to assess (among other things) implementation of the STWOA in a representative sample of states and school districts across the country. Some preliminary results from this project have been published and will be cited extensively in the next section (Hershey et al., 1997; Silverberg et al., 1998).

A second strand of literature is concerned with what might be called "process" outcomes. This literature looks for the most part at local STW systems and programs and seeks to identify the elements that "work" in the sense that they have engaged the students,

teachers, and employers who participate in them in a significant way. Much of this literature is also anecdotal (Olson, 1997; Urquiola et al., 1998). Nonetheless, some fairly clear conclusions for STW programming design emerge from it.

The third strand focuses on student outcomes, both educational and occupational. Since the STW movement is fairly recent, no studies have yet been completed which measure these outcomes for the newly established STW systems (the Mathematica study cited above will eventually do so for systems established under the STWOA). It will therefore be several years or more before solid evidence is available concerning the impact of STW programming on educational achievement and labor market success. However, findings from recent studies of individual STW programs and from an older literature on the effectiveness of vocational and cooperative education are applicable here and will be reported on below.

Research Conclusions Relevant to STW Programming

Section III identifies the seven key elements of the model local STW system based on an extensive review of the writings of STW advocates, researchers, and practitioners. As noted in the previous section, some of these elements pertain to program structure (coherence, range of activities, extent of student participation, etc.) and others to student outcomes (improved academic achievement, enhanced career skills, etc.). This section asks, and then attempts to answer, the following two questions. First, to what extent do high schools currently have STW systems with each of these elements? And, second, how likely is it that each element will eventually become an important part of the nation's secondary education landscape? To the extent possible, results drawn from all three strands of the STW research literature will be used to arrive at our conclusions.

- Coherent combination of linked activities

All evidence on the evolution of the STW movement suggests that many schools across the country have committed themselves to establishing comprehensive local STW systems (Olson, 1997). In addition, case analysis of successful systems tends to show that they provide a linked sequence of activities that span the four years of high school (Charner et al., 1995). However, few schools have currently in place anything like the complete model (Hershey et al., 1997; Silverberg et al., 1998). Many schools, for example, have career awareness activities but relatively few offer a comprehensive career development program. Also, substantial efforts are going into the development of workplace opportunities for students, but progress is much slower in integrating those activities with classroom lessons. As a result, relatively few students so far have engaged in the broad range of activities envisioned by STW advocates. Undoubtedly, participating schools will continue to move forward in building the requisite "coherent combination of linked activities," but the complexity and cost of the ideal system must realistically be considered major barriers to its achievement.

Unfortunately, the largely anecdotal research on the importance of having an integrated STW system rather than just a menu of unrelated activities suggests that linkage

is quite important if significant student achievement gains are to be attained. To achieve this goal Ostermann and Iannozzi (1993) emphasize that substantial student learning must take place in both the school and the workplace and what is learned in the two venues must be mutually reinforcing. Charner et al. (1995) stress that that there must be "multiple points of contact" between a school's curriculum and its students' work experiences.

- School-based learning activities

As envisioned by the STWOA, school-based learning activities encompass two interrelated groups of STW system components. The first group consists of career development activities. These focus on helping students begin the process of career selection. The second group, building on the first, consists of curricular elements -- course units, entire courses, or sequences of courses (career majors or academies) -- that are explicitly linked to particular industries and/or occupations.

Career development appears to be the most fully established element in STW systems around the country (Hershey et al., 1997; Olson, 1997; Silverberg et al., 1998). A typical program includes activities that heighten student awareness of their own interests and aptitudes, increase their knowledge of alternative career options, and strengthen their work readiness. Almost 80% of the students in Mathematica's survey of STWOA local partnerships participated in a reasonably comprehensive set of such activities (though not necessarily in a coherent sequence). There are a variety of reasons for the early success of career development as an STW focus. In many cases, schools built upon preexisting career programs that had proven popular with students, parents, and school staff. In addition, many career development activities can be launched fairly quickly because they do not require substantial effort, resources, or collaboration with outsiders.

Not surprisingly, perhaps, forward movement in establishing career-focused curriculum elements has been much slower. The Mathematica study found that about half the schools in its survey are experimenting with integrating academic and vocational education through career majors, career academies, and other career-focused programs of study, but relatively few students in the survey (about 15%) participate in such programs.

In part, this slow progress is a consequence of the difficulty of the task. Building career-focused courses and programs which genuinely integrate academic and vocational components requires enormous effort on the part of teachers and other school staff, particularly when substantial resources for professional development and released time are not available (as is usually the case). More importantly, however, creating an integrated curriculum appears to be a relatively low priority in most schools compared to career awareness. Resource constraints may partially explain this disparity, but a more important reason appears to be the widespread doubts of students, parents, and school staff that secondary education should be organized around careers, occupations, and industries. Given breadth and depth of this concern (reported by a broad range of STW researchers), it seems unlikely that participation in career-focused curricula will ever approach a majority of secondary students.

- Work-based learning activities

Most advocates regard the work-based learning component of the STW model to be its most distinctive and important feature. As a result, work-based learning activities have been a high priority in early STW efforts at the local level (Hershey et al., 1997; Bailey, 1995b). Schools are attempting to expand the breadth of such activities by increasing the number of participating students and employers. They are also trying to increase activity depth by developing more intensive workplace experiences that include paid employment, on-the-job mentoring, and close linkages with academic courses. Frequently they are building on preexisting programs and employer relationships in these efforts.

In general, schools seem to be making significant advances in broadening student participation in those work-based learning activities that don't require significant student time and employer involvement (Hershey et al., 1997). These include job shadowing, worksite visits, unpaid internships, community service projects, and school-based enterprises. Building linkages between these activities and the students' academic program is proceeding more slowly.

Progress in developing more in-depth workplace activities, particularly those involving paid positions with structured training and significant hours, has been more deliberate (Bailey, 1995a; Hershey et al., 1997). Part of the problem lies with student demand for such positions. Many students are already devoting significant effort to after school jobs or extracurricular activities which they are reluctant to give up. They therefore have neither the time nor the inclination to involve themselves in intense work-based learning activities outside of school. More importantly, it is often difficult to increase the supply of such positions because of their high cost and limited benefit to most employers (Osterman, 1995). In addition, schools often don't have the resources or expertise to engage in job development activities on a large scale. Some research studies, however, have shown that these obstacles to employer and student recruitment can be overcome with adequate planning and organization (Hughes, 1998).

Notwithstanding the success stories reported in the STW literature, it is doubtful that a large portion of high school students will ever be engaged in intense work-based learning activities that require significant time away from school and extensive coordination with classroom teachers. The employer incentives identified by Bailey (1995a) do not appear to be strong enough to permit significant "scaling up" from existing levels. Also, the widespread doubts, noted above, about career-centered education and the myriad competing demands on students' time will limit the number of youth who will seek such opportunities. It does seem likely, however, that less intrusive work-based learning activities will eventually become a permanent part of the high school experience for the majority of American young people.

- Connecting activities

A comprehensive STW system requires a substantial amount of administrative support, a major component of which must be directed toward establishing and then

maintaining linkages between the school and the employers with whom it is placing its students. Despite their importance, relatively little has been written about these connecting activities. (One reason perhaps is that such "nuts and bolts" functions simply do not capture the imagination of education writers and reformers the way school-based and work-based learning activities do.)

In general, STW writers and advocates implicitly assume that connecting activities will be carried out by the existing staff of teachers and guidance counselors in a school with a small amount of support and direction from the school's central administration. In the absence of extra pay or a compensatory reduction in other responsibilities, such activities, of course, represent an "add on" to the existing duties of these individuals. The Mathematica study presents anecdotal evidence showing that many schools are struggling with this issue (Hershey et al., 1997). Teachers are being encouraged through both moral and material incentives to become more aware of career opportunities for their students, to help students make choices among the options available, and to work with employers on curricula. At the same time the role of guidance counselors is being redefined to increase their involvement in career awareness and job development. They are collaborating more with teachers and employers and working to establish career elements in the academic curriculum.

A fundamental question of resources remains however. Building and then maintaining a set of school-employer collaborations which will collectively provide truly integrated work- and school-based learning experiences for a significant number of students is a difficult task, not least because few school personnel have skills or experience in accomplishing it. In addition, most teachers and guidance counselors are more than fully occupied with their regular responsibilities. It is hard to escape the conclusion, therefore, that additional resources will have to be devoted to STW programming in this area if a fully linked school-workplace system is to be established for more than a few students. Whether such resources will be forthcoming from local education budgets remains to be seen.

- Broad range of students

Research on the current state of STW programming shows clearly that schools are making a substantial effort to be as inclusive as possible in engaging students in STW activities (Hershey et al., 1997; Olson, 1997). All types of students, for example, appear to be participating in the less intensive career awareness activities (interest inventories, career seminars) and work-based learning activities (job shadowing, worksite visits).

These efforts are supported by anecdotal research findings indicating that the most successful current systems provide channels to a variety of post-secondary options including immediate employment, advanced training, junior college, and baccalaureate higher education (Charner et al.; 1995; Stern et al., 1995). Researchers differ in their evaluation of these various options. Some attach particular significance to links to community and junior colleges (Dougherty, 1994; Grubb, 1996). Connections to noncollege training programs are emphasized by others (Hansen, 1994). Bailey and

Merritt (1997) present evidence to show that a well-designed STW program has much to offer students who are bound for a four college or university. Osterman and Ianozzi (1993) argue that STW systems must allow students to change their minds about long term education and career goals without penalty.

- Higher academic achievement

As noted earlier, nearly all STW participants believe that for the movement to succeed it must raise academic achievement, conventionally measured, for at least some students (Olson, 1997). Recent evidence from the economics of education literature and other sources suggests that this emphasis is well-placed. Higher academic achievement will increase chances both for successful attainment of a postsecondary degree and for long run success in the labor market (Murnane et al., 1995; National Center for Education Statistics, 1996; Pryor and Schaffer, 1997). In addition, a strong academic focus is consistent with long run changes in the structure and delivery of vocational education in the U.S. Responding to business concerns that traditional vocational education lacked sufficient intellectual content (Panel on Secondary School Education and the Changing Workplace, 1984), the 1990 Perkins Act requires that federal vocational education subsidies be given only to programs that integrate vocational and academic curricula. Finally, keeping STW programs focused on academic achievement is consistent with trends showing that high school students have been shifting from vocational to academic subjects since the early 1980s (National Center for Education Statistics, 1996).

It has not yet been determined, however, whether STW systems, even when well designed and funded, will actually succeed in raising academic achievement. Some early, largely anecdotal, studies report that participation in STW activities improves certain aspects of student academic performance, but for the most part existing research on the subject has not discovered any strong effects (Jobs for the Future, 1995; Pauly et al., 1995; Stern et al., 1995). Urquiola et al. (1998) review a series of reasonably well-designed case studies of individual STW programs and find that their effects on grade point average, class rank, attendance are mixed, with some producing gains and others not. Lynn Olson, on the other hand, in her comprehensive overview of the STW movement (1997) found little evidence of increased academic learning in the programs she examined. Thomas Bailey in his summary of presentations at a Brookings conference on employer involvement in STW programming concluded that currently there is little empirical support for the STW learning model (1995b).

It is possible that this important issue will be resolved in the years ahead as the results of careful large-scale studies become available. However, given the complexity of the typical STW program and the difficulty researchers generally have in isolating the independent effects of a particular intervention (Urquiola et al., 1998), it is unlikely that we will ever have definitive quantitative measures of the impact of STW programming on academic performance.

- Enhanced career skills

From the very beginning of the STW movement, advocates have seen STW programming as a way of addressing the widely-perceived job skill deficiencies of American youth, particularly for the majority of young people who will not eventually complete a four year college degree. Taking their cues from an ever more vocal business community, advocates have interpreted the concept of "skills" quite broadly to include specific job skills, general skills, and appropriate work attitudes.

There is little doubt that a substantial proportion of nonbaccalaureate youth have a difficult time establishing themselves in the labor market. Their high rates of unemployment, low wage rates, high turnover, and generally negative reputation among employers all suggest that many are leaving the educational system lacking one or more essential job skills (Ostermann, 1980; Zemsky, 1994; Gardecki and Neumark, 1995; Klerman and Karoly, 1995; Holzer, 1996). The goal of the STW movement to substantially strengthen these skills is, therefore, a worthy one.

Unfortunately, however, there is currently little direct evidence that STW programming will in fact enhance job skills and attitudes sufficiently to have a measurable effect on any of the labor force performance indicators listed in the previous paragraph (Bailey, 1995b). Just as was the case with STW's effect on academic achievement, definite conclusions must wait until the completion of research studies that systematically isolate program effects from all others (and taking selection bias into account). The existing body of research on vocational education, job training, and computer skills does, however, suggest certain design principles that should help make STW systems more effective in this area.

It is generally agreed that a successful STW program must provide its students with general work skills valued in the market and with a work ethic that will enable them to take advantage of those skills (Olson, 1997). Research suggests that programs which focus only on the provision of general skills without attempting to motivate students to acquire and use them are unlikely to be successful (Stasz, et al., 1990). The SCANS report (Secretary's Commission on Achieving Necessary Skills, 1991) provides a useful catalogue of the general competencies, skills, and personal qualities that such a program should seek to inculcate in its students.

To the extent that students receive specific job training in a STW program, it should be relevant to the jobs available in the local economy since most non-baccalaureate students do not seek employment outside the region where they attended school (Grubb, 1996). Also, the training should be for jobs that pay above the minimum wage and have promotion potential. Programs that provide "training" for low quality jobs have not been very successful (Osterman and Iannozzi, 1993). Alan Krueger's work (1993) suggests that training in computer skills is particularly likely to be rewarded in the labor market. If possible, training should be formally recognized with a certificate that has value in the eyes of prospective employers (Commission on the Skills of the American Workforce, 1990; U.S. Government Accounting Office, 1991). Research on cooperative education indicates that the absence of skill certification limits the ability of co-op students to capitalize on their education in the marketplace (Stern and Stevens, 1992).

Finally, research on vocational and cooperative education has tended to show that these programs only provide economic gains to students whose subsequent employment is in the area of their high school occupational concentration (Rumberger and Daymont, 1984; Campbell et al., 1987). In addition, some evidence suggests that these positive effects are increasing over time (Bishop, 1994). Unfortunately, most vocational and cooperative education graduates do not find placements in their concentration area (Bishop, 1989). These results suggest strongly that to be successful STW programs will have to make a special effort to place program graduates in jobs that will utilize the specific skills they learned in school.

Concluding Remarks

The STW movement is still very much in a state of evolution. Research findings in future years about implementation and programmatic benefits, particularly those pertaining to student outcomes, are likely to reshape and redirect it in ways that cannot yet be appreciated. In addition, more information is needed about the costs of STW programming in terms of other educational initiatives foregone. It is therefore far too early to come to any definitive conclusions concerning the long run impact of the movement on the American educational system. Nonetheless, the research evidence accumulated so far permits some tentative predictions concerning what this impact is likely to be.

First the bad news. It seems highly improbable that anything like the ideal STW system will ever be permanently established in a significant number of American high schools. The principal roadblocks, we believe, are fourfold. First, there are significant resource constraints. As was noted repeatedly in the previous section, full implementation of a broad and deep STW system is expensive. It is extremely doubtful that many schools will be able to mount and then sustain such a system without a prohibitive expenditure on additional staff. Second, the amount of student time available to participate in STW activities both inside and outside the classroom is limited. Inside the classroom, STW activities compete with academic work; outside they compete with extracurricular activities and after-school jobs. Students today simply don't have the free time that they once did. Third, sufficient employer participation to fully implement the work-based learning component of the model for large numbers of students is probably impossible to achieve for most schools. In part this is a resource issue, but more fundamentally it is simply not in the interest of most business firms to involve themselves in the education of high school students. Fourth, and perhaps most important of all, the stigma that has traditionally attached itself to all forms of work-based education affects the STW movement as well. In spite of the best efforts of STW proponents, many administrators, teachers, parents, and students will always see STW activities as really appropriate only for the noncollege-bound. This attitude will exert continuous negative pressure on the resources, energy, and enthusiasm needed to sustain a good STW system over time.

The preceding perhaps sounds excessively gloomy, but there is some good news too. The commitment of educators, employers, government leaders, and the public generally to the broad provision of some form of work-based education to American

students seems strong and enduring. It is, therefore, very unlikely that the STW movement will disappear without making some substantial mark on the way the nation delivers secondary education to its young people, though that mark will fall far short of the ideal STW model. Although prebaccalaureate students will be affected by this change, the greatest impact will be felt by students who will not go on to graduate from a four year college or university. In the eyes of many educators, this group has been consistently underserved by a secondary school system focused almost entirely on preparation for higher education at baccalaureate institutions. To the extent that the STW movement can bring into existence new instructional modalities that give these students a better high school education and enhanced their labor market skills it will have rendered the nation a great service.

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IMPLEMENTATION OF A MODEL FOR STRATEGIC PLANNING IN A REGIONAL TECHNICAL EDUCATION CENTER

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Purpose

The primary purpose of this study was to develop a community-based strategic planning model for use in regional vocational-technical education centers. The model was designed for use by educators desiring to address the fast pace of change with a coherent plan for program adjustments. The secondary purpose of the study was to examine the effectiveness of the model in the preparation of a strategic summary report for a regional technical education center and to compare the recommendations with advisory committee minutes and the district's long-range plan.

Introduction and Theoretical Base

Vocational education has seldom functioned with a systematic plan to keep pace with labor market demands. It has evolved as a series of legislated responses to societal, business, and industry conditions (Swanson, 1966). Vocational education has not been an adequate vehicle for change in a dynamic society (Wilms, 1988). According to Wilms (1988), vocational education has continued, since 1917, to maintain "the American Dream—getting ahead by one's own hard work" (p. 81). Wilms stated this "American belief system provides a social rationale for vested economic and political interests and insulates the vocational education system from external demands for change" (p. 81). Although an avid proponent of vocational education, Swanson wrote in *Development of Federal Legislation for Vocational Education* that vocational education "undertakes to do nothing that has not been done before. It merely strives to discharge the function more efficiently" (p. 4). Recent examples of legislated responses can be found in the passage of legislative acts, which mandated that vocational education respond to the needs of society, business, and industry.

The Carl D. Perkins Vocational Education Act of 1984 was designed to encourage schools to reach out to *under served populations* and to modernize and improve programs. Pressure was on to cease or reduce funding to obsolete vocational programs (U.S. General Accounting Office, 1989). The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 was even more aggressive in the pursuit for reform. Congress demanded that vocational educators respond to the failure of state and local efforts to improve student performance. The Perkins Act mandated positive change by allocating

money for expenditures in each vocational school to integrate academic and vocational education, to fund documented successful programs, and to serve poor and disadvantaged people (Jennings, 1991).

More recent legislation regarding academic and vocational schools is the School-to-Work Opportunities Act of 1994. Still, most schools were in a reactionary mode even as they were asked to essentially restructure schools. The School-to-Work Opportunities Act recommends school and business partnerships, the integration of vocational education and academic course work, and the adoption of career pathways for all students (Hudelson, 1994).

Vocational education can no longer just react and be viable in the future (Graves & Moran, 1994; Bryson, 1988; McCune, 1986). The performance and success of vocational education depends on the ability of vocational administrators and their planning teams to assume leadership roles, face outward, and make revolutionary changes. Vocational leaders need to prepare to restructure. "Restructuring calls for a fundamental examination of changes in the larger society and for a process for making decisions about the desired future of schools" (McCune, 1986, p. 26).

Few vocational educators are adequately equipped with planning tools which respond to the rapid changes in society and technology. This is due, in part, to educators and their resistance to change. Many school administrators believe strategic planning to be inappropriate for public schools. They claim it will not work with the multitude of federal and state regulations and funding parameters (Moldof, 1993). Many educators are content to carry on business as usual with the traditional planning done by programmatic advisory committees.

Strategic planning can help vocational educators make important decisions about innovation, technology, and excellence and take critical action to respond to society and its rapid pace of change (Cook, 1995, p. 34). Navaratnam and O'Connor (1993) stated that vocational educators will be unable to meet the needs of the nineties without strategic planning focused on improving quality. He feels the "current process and activities must be changed to meet the emerging needs in skills training. Vocational education cannot rely automatically on its current resources to achieve the quality expected by stakeholders" (p. 117-118). According to Navaratnam, the only way to add value to vocational programs is to strive for continuous high quality through strategic planning.

King and Cleland (1987) recommended strategic planning to "provide direction instead of drift" (p. 558). In their discussion of small firms, they indicated that "many survive for a while without this tool, but its absence deprives a firm of opportunities and stability" (p. 558). McCune (1986) in a *Guide to Strategic Planning for Educators* also addressed new opportunities, alternatives, and pressures as major forces supporting the need for strategic planning in schools.

Methods

After a literature review of the strategic planning processes used in marketing, business and industry, higher education, and public education, the strategic planning model for regional technical education centers was developed. Planning components which aligned with the needs and functions of technical education were identified and selected from the various strategic planning processes found in the literature review.

The strategic planning processes examined were set up in three phases: planning, implementation, and evaluation (the outline of the model is appended to this paper). The planning phase, stage one, of the model was tested for its effectiveness at a regional technical education center. The data collection method identified for use in the model was the stakeholder focus group. A literature review of focus groups was conducted to determine the best practices and methodology used in focus group research.

Data Sources

The strategic planning model, stage one, was then implemented using five focus groups made up of the school's stakeholders living within a 30 mile radius. Fifty participants, 10 for each group, were asked to participate in one of the focus groups: small business, school related, manufacturers, health care, and agriculture. The categories of the focus groups were selected to align with the program areas of the center and subsequently were the largest sectors of stakeholders.

A moderator guide, focus group questions, and information overview were prepared to facilitate the two hour focus group sessions conducted by a professional moderator. The sessions were recorded and later transcribed for use with *Ethnograph v4.0*, a software program for qualitative data analysis. The data analysis was used to prepare the strategic summary report. The report was then compared with local program advisory committee minutes and districts' five-year plan to determine the efficiency and effectiveness of stage one of the strategic planning model.

Results

The following conclusions and implications were derived from this study.

1. The strategic planning model developed for regional technical education centers is valuable in obtaining a broad range of information for making important decisions about innovation, technology, and excellence.
2. The strategic planning model, stage one, generated enough previously known and unknown data to develop a strategic summary report describing strengths, weaknesses, opportunities, threats, external and internal analyses, and recommendations.

3. The quality of information gathered was of sufficient quantity and quality to write a strategic summary report. The amount and type of information gathered exceeded the technical education center's previously collected information. The comparison was made using three years of programmatic and administrative advisory meetings minutes and the school district's five-year planning document.
4. The information generated in the strategic planning report was comprehensive in nature. Information was generated covering the economic, demographic, political, social, educational, and technological changes in the service area. Very little of this information was previously discussed or documented in advisory committee minutes or the district's five-year plan. The advisory minutes primarily reflected needs and recommendations concerning curriculum, equipment, facilities, staffing, and budgets. The five-year plan identified goals, objectives, timelines, and chairpersons for the district.
5. Thirty-five recommendations were generated by the stakeholders. Although the list was prioritized, there are too many recommendations to address at the same time. According to the design reported in stage two of the strategic planning model, work will continue with an implementation team to convert the strategic summary to an action plan with a manageable number of recommendations.
6. The local stakeholders are a source of the valuable information needed for the strategic planning process.
7. The information gathered through advisory committees is useful in making programmatic decisions and plans but is not sufficient in depth or breadth upon which to develop a strategic plan for a regional technical education center.
8. Five-year plans that address district goals and objectives appear to be a result of an internal analysis of the district without in-depth consideration or documentation of the external environment, strengths, opportunities, or threats.
9. The information in the advisory committee minutes would be helpful in developing the Implementation Plan, stage two, of the strategic planning model.
10. The information developed internally by the long range planning committees would be better utilized if integrated into the strategic planning process.
11. The stakeholders of a regional technical education center have the desire and willingness to help schools with planning. Their effectiveness and efficiency is enhanced if they are given sufficient information prior to the planning meetings and are led through the process.
12. Focus groups provide a wealth of information in a short amount of time with a small amount of effort and cost.
13. Regional technical education centers must utilize some strategic planning format in order to be responsive to the fast pace of change confronting vocational-technical education.

Implications

The strategic planning model utilizing focus groups designed for use by regional technical education centers, successfully met two levels of review. Prior to implementation, two educators assigned to planning and evaluation at the state level reviewed the process and made recommendations for improvement. The other level of review was the measure of success of the data obtained in stage one, planning, of the model using stakeholders in a regional technical education center. The 45 stakeholders became thoroughly involved in the focus groups and contributed information not previously available via advisory meetings or long-range planning committees.

Vocational advisory committees have been successfully utilized to upgrade curriculum and equipment in training programs. However, advisory committees alone will not meet the challenges and changes faced in today's information society. Vocational educators need a method to respond to "...the economic, demographic, political, social, educational, and technological changes in the environment that already are affecting our schools" (McCune, 1986, p. v). Educators who fail to find a successful method to keep pace with rapid change will find other organizations encroaching on their training mission. In addition, schools will be left with a severely weakened position in their communities (Cook, 1995).

On the positive side, vocational schools are in a position to respond to ensure their survival and assist the communities they serve (McCune, 1986; Bryson, 1988). The United States is still in a transitional era. The information society gives us hope for a new and improved way of life. To achieve this we must build a new culture—a culture of shared understanding and commitment to the common good. Education and training must be aimed at demonstrating how to achieve this culture. Schools must lead the way. They must meet the human needs of their local communities and give to one and all, youth and adults, the tools to prosper in our changing society (McCune, p. 62).

"History suggests that it is difficult for any civilization that excelled in one age to maintain its achievements under a new set of conditions. Our tendency is to stick with the things that worked in the past in the hope that they will eventually work again" (McCune, 1986, p. v). Vocational educators continue to carry on this behavior and have remained reactionary to the forces around them. The strategic planning model described in this paper provides a viable planning alternative for those educators seeking to provide programs that best meet the needs of an ever changing global work place.

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THE EFFECTIVENESS OF COMPUTER-ASSISTED INSTRUCTION IN TECHNICAL EDUCATION AND TRAINING

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Overview

As workplaces become technologically more advanced, employees are increasingly required to engage in higher order thinking. Resnick (1987) noted that although higher order thinking cannot be defined exactly, it can be described using the following features: (a) nonalgorithmic -- the action path is not fully specified in advance, (b) complex -- the thinking path is not "visible" from any single vantage point, (c) yields multiple solutions rather than unique solutions, (d) involves uncertainty -- not all information needed to solve a problem is readily known, (e) involves self-regulation of the thinking process, and (f) effortful -- requires considerable mental work in making elaboration and judgements.

In preparing students for technologically-oriented workplaces that require higher order thinking, appropriate learning theories and pedagogical principles should be applied. With the increasing availability and accessibility of microcomputers, instruction that combines sound learning principles with the functionality of computers forms a potentially effective teaching method called computer-assisted instruction (CAI).

Early in the development of CAI, numerous studies were conducted (e.g., Schwartz & Long, 1967; Attia, Miller & Kitz, 1975) that compared CAI effectiveness with the effectiveness of more traditional instruction. In these studies, achievement of students taught through CAI was compared with those taught through traditional instruction. A subset of these studies focused on CAI in technical education and training. However, results from these early studies, that focused primarily on "lower order" learning, were equivocal. To reach a conclusive statement on the effectiveness issue, several meta-analyses were performed with results that generally favored CAI.

These results of CAI research over the years and the increasing power of computers have contributed to the development of much improved CAI that can more easily engage students in higher order thinking. In the same manner that early CAI was investigated, effectiveness of more recently developed CAI was compared with traditional instruction. Several studies showed that CAI was generally more effective than traditional instruction (e.g., Gott, 1995; Parchman et al., 1997) while others showed no difference (e.g., Shute & Gawlick-Grendel, 1996; Yuill, 1991). Results of research studies comparing CAI that

focused on higher order thinking in technical education and training with traditional instruction have, likewise, been inconclusive.

Thus, one purpose of this study was to quantitatively analyze contemporary individual studies that have investigated the effectiveness of CAI in technical education and training as compared to traditional instruction, with the intent of determining the overall effectiveness of CAI in this field. The study focus was on higher order learning. A second purpose was to determine the difference in CAI effectiveness of studies grouped into different categories. The following questions related to higher order thinking in technical education and training were formulated to guide this research (Note that questions 3 through 7 were formulated after the findings from question 2 were known).

1.What is the overall effectiveness of CAI on achievement as compared to traditional instruction?

2. What are the study features and corresponding categories on which differences in CAI effectiveness can be investigated?

3. Is there a difference in effectiveness between the following types of CAI: (a) CAI, and (b) intelligent CAI?

4. Is there a difference in effectiveness between the following nature of CAI treatment: (a) CAI that replaced traditional instruction, and (b) CAI that supplemented traditional instruction?

5. Is there a difference in effectiveness between CAI studies that grouped subjects according to (a) random assignment, (b) intact groups, and (c) other types of subject assignments that were not random or intact groups?

6. Is there a difference in effectiveness between CAI that was implemented at the following educational levels: (a) secondary / postsecondary, (b) university, and (c) adult military?

7. Is there a difference in effectiveness between CAI that was implemented in the following settings: (a) civilian, and (b) military?

Framework

The application of a theoretical framework to a meta-analysis is different from its application to an individual or primary study. The establishment of a theoretical framework for a meta-analysis should be linked to the study purposes. The purposes of this meta-analysis, as stated above, are related to various features of the primary studies. Therefore, these features and their corresponding categories could only be determined after selected studies have been examined in detail. This approach to formulating study purposes has

been practiced in many previous meta-analyses (e.g., Kulik et al., 1986; Roblyer et al., 1988). The presence of variations within categories of study features help to explain variations in the observed differences in CAI effectiveness. For example, it might be determined at which educational level CAI is most effective. Another possible focus could be the determination of a CAI type that is most effective. The different types of CAI selected for this meta-analysis have been based on different theoretical underpinnings. Nevertheless, it can be said that CAI is designed from two broad theoretical perspectives -- behaviorist or cognitivist. The choice of one theoretical basis over the other is dependent on several factors such as educational level and outcomes of instruction. As a study conducted at the macro level, it was thus appropriate for this meta-analysis to utilize a framework for CAI that encompasses both the behaviorist and cognitivist perspectives in their broadest sense (Chambers & Sprecher, 1983).

Techniques and Data Sources

The methodology used in this study was meta-analysis. It is the statistical analysis of a collection of analysis results from individual studies for integrating the findings (Cooper & Hedges, 1994). It is widely used in both education and medical research to combine, in quantitative terms, the results of many studies into a single metric, called effect size (Fletcher, 1997). Effect size is a standard score that is calculated by dividing the difference between the means of two comparison groups by the standard deviation of either the control group or the combined distributions.

Studies were located, identified, and collected for analysis through computer and manual procedures. Several criteria were followed in locating studies for this analysis: (1) Studies must involve instruction in the field of technical education and training, which include those conducted in the military, (2) Studies must be retrievable from university libraries, and (3) A comparison was made in the studies between a group of students that received computer assisted instruction and another group that was taught in the traditional manner, with student learning in both groups measured in some form.

Computer and manual searches were performed to locate suitable studies. A published search from NTIS was also used to identify studies. Study abstracts obtained were read to eliminate studies that were not within the focus of this meta-analysis. Based on information from these abstracts, studies that met the given criteria were gathered through university library services. Due to access restrictions, obtaining military studies took two months to complete. The 70 studies gathered for analysis were conducted between 1967 and 1997. Studies published or conducted between 1987 and 1997 were examined first to include: (a) primary studies that were not used in previous meta-analyses, (b) primary studies that used newer computer technology, and (c) an adequate number of studies to begin the meta-analysis. Subsequent data screening resulted in 21 usable studies. The instructional content of these studies are shown in Table 1. These studies were next

examined for soundness of experimental design. All were found acceptable for subsequent analysis.

The effect size chosen as a basis for comparison across studies was the standardized mean difference. Effect sizes were calculated from (a) posttest effect size only, (b) the difference between posttest effect size and pretest effect size, (c) t-statistic, and (d) F-statistic from ANCOVA tables.

Results

The final set of 21 studies yielded 28 effect sizes (several studies reported multiple effects). The number of subjects from these studies totaled 2969. The study features and their effect sizes are shown in Table 2. All the studies focused on higher order learning and were conducted in either the civilian or military sector. The overall effect size of computer-assisted instruction in technical education and training was 0.35.

Overall Effect.

In terms of effectiveness of instruction, students receiving CAI outperformed students receiving traditional instruction by 0.35 standard deviations. An interpretation of this value is if the same performance measure was applied for both groups, the "average" students taught in the traditional manner who scored at the 50% level would have scored at the 64% level if taught through CAI.

CAI Type and Effectiveness.

There was a significant difference in effectiveness between Intelligent CAI ($M = 0.65$, $SD = 0.54$) and CAI ($M = 0.27$, $SD = 0.39$), $t(25) = 2.1$, $p < .05$. Intelligent CAI was significantly more effective than CAI.

Table 1
Primary Studies Selected for the Meta-analysis

	Study	Year	Instructional content
1	Fouad & Burleson	1997	Endodontic diagnosis
2	Parchman, Ellis, Christinaz, & Vogel	1997	Electricity and electronics
3	Gokhale	1996	Building an amplifier
4	Shute & Gawlick-Grendel	1996	Problem solving in probability
5	Gott	1995	Complex troubleshooting
6	Johnson	1994	Ship damage control
7	Janniro	1993	Deception test questioning
8	Livergood	1993	Intelligent tutoring system.
9	Faryniarz & Lockwood	1992	Environmental analysis
10	Johnson et al.	1992	Complex troubleshooting
11	Shlechter et al.	1992	Leadership role-playing
12	Spotts	1992	Pneumatics
13	Yuill	1991	Critical thinking skills
14	Shute & Glaser	1990	Principles of economics
15	Kennison	1990	Military job skills
16	Shute, Glaser, & Raghavan	1989	Principles of economics
17	Buergermeister	1989	Cost control
18	Hwang	1989	Computer numerical control programming
19	Ogle et al.	1989	Soil loss (agriculture)
20	Gott	1989	Complex troubleshooting
21	Malec & Luszczak	1987	Helicopter electromechanical bladefold system

Table 2
Study Features and Effect Size

	Effect Size			
Study Features	N	Subjects	M	SD
CAI Type[a]				
CAI	18	2513	0.27	0.39
ICAI (ITS)	9	385	0.65	0.54
Nature of CAI Treatment [b]				
Replacement	19	1248	0.32	0.44
Supplement	8	1667	0.49	0.52
Subject Assignment [c]				
Random	8	738	0.23	0.31
Intact groups	7	322	0.40	0.51
Matched & random / other	7	1743	0.34	0.38
Educational Level [d]				
Secondary / postsecondary	4	465	0.11	0.25
University	14	726	0.11	0.55
Adult military training	9	1758	0.44	0.41
Setting				
Military	9	1758	0.44	0.41
Civilian	19	1211	0.37	0.50

[a] One effect size was omitted because the corresponding study did not report CAI type
[b] One effect size was omitted because the corresponding study did not report the nature of treatment
[c] Six effect sizes were omitted because the corresponding studies did not report how subjects were assigned
[d] One effect size was omitted because the study was conducted with employees of a business entity

Nature of Treatment and Effectiveness.

There was no significant difference in effectiveness between CAI applied as a replacement to traditional instruction ($M = 0.32$, $SD = 0.44$) and CAI applied as a supplement to traditional instruction ($M = 0.49$, $SD = 0.52$), $t(25) = 0.89$, $p > .1$.

Type of Subject Assignment and Effectiveness.

Subject assignment into groups were categorized into three types: (a) random assignment, (b) intact groups, and (c) subject assignments other than the preceding two types. There were no significant differences in effectiveness between random assignment ($M = 0.23$, $SD = 0.31$), intact groups ($M = 0.40$, $SD = 0.51$), and other arrangements ($M = 0.34$, $SD = 0.38$), $F(2, 18) = 0.37$, $p > .1$.

Educational Level and CAI Effectiveness.

Three educational levels were considered: (a) secondary / postsecondary ($M = 0.11$, $SD = 0.25$), (b) university ($M = 0.45$, $SD = 0.55$), and (c) adult military training ($M = 0.44$, $SD = 0.41$). There were no significant differences in CAI effectiveness between the three levels of education, $F(2, 23) = 0.88$, $p > .1$.

Setting and CAI Effectiveness.

Studies were analyzed using a t-test to determine whether there was a significant difference in effectiveness between CAI in military ($M = 0.44$, $SD = 0.41$), and civilian ($M = 0.37$, $SD = 0.50$) settings. It was discovered that the difference was not significant, $t(26) = 0.35$, $p > .1$.

Conclusions

Computer-assisted instruction that involved higher order learning in technical education and training was more effective than traditional instruction. The degree of this effectiveness was represented by an effect size of 0.35. Based on the classification of effect sizes, this magnitude is considered "small to medium". This result is comparable to several other meta-analyses of CAI effectiveness in technical training. Fletcher (1990) found an overall effect size for military training to be 0.39, indicating an improvement in the average student performance from the 50th percentile to the 65th percentile for the computer-based group. Kulik et al. (1986) found a slightly higher overall effect size of 0.42 from 18 studies in technical training that were conducted between 1964 and 1979 implying a 50th to the 66th percentile gain by the average student. The moderate magnitude of the overall effect size in this study also seems to agree with the observation that CAI program developers

"have apparently been less successful in teaching the higher order skills emphasized at higher educational levels" (Kulik & Kulik, 1991, p. 76).

Intelligent computer-assisted instruction (ICAI) was significantly more effective than non-intelligent computer-assisted instruction for higher order learning in technical education and training. This finding provides support for the benefits of using ICAI in teaching higher order subject matter and higher order skills. The literature review did not identify previous studies that compared ICAI with conventional CAI, therefore preventing any direct comparisons. However, a different basis of categorization of CAI types was found in the literature. Kulik et al. (1986), and Kulik and Kulik (1991) classified CAI into three types: (a) Computer-Assisted Instruction (CAI), (b) Computer-Enriched Instruction (CEI), and (c) Computer-Managed Instruction (CMI). They defined CAI as drill and practice, and tutorial; CEI as simulation and calculating tools; and CMI as programs that keep student records, guide students!, and record students' progress. None of the researchers who used this categorization in their meta-analyses found any significant difference between CAI, CEI, and CMI.

No difference existed between achievement for supplemental CAI and replacement CAI. This non-significance may be due to the amount or proportion of additional instruction in supplemental CAI in relation to the traditional instruction received by the experimental and control groups. Some supplemental CAI studies provided only five hours of additional computerized instruction. Perhaps, a minimum amount of supplemental CAI must be provided before a significant difference can be achieved. In addition, while the supplemental CAI is being provided, students in the control group may have used the time to review the lesson by themselves and therefore may be able to perform as well as the experimental group.

There were no significant differences in CAI effectiveness between the various types of subject assignment into experimental and control groups. A non-significant difference was also found by Fletcher-Flinn and Gravatt (1995), who categorized subject assignment into random, non-random, repeated measurements, and "not categorized" (p. 229). Similar results were also found in meta-analyses by Kulik et al. (1986), and Kulik and Kulik (1991). Therefore, when due consideration is given to the use of proper research methodology, types of subject assignments other than random assignment can continue to be used in CAI effectiveness studies.

Three educational levels were considered: (a) secondary / postsecondary, (b) university, and (c) adult military training. There was no significant difference in the CAI effectiveness among the levels of education. This finding is in agreement with that of Fletcher-Flinn and Gravatt (1995), who compared CAI effectiveness for adult training, tertiary, and secondary. However, Liao and Bright (1991) found that CAI effectiveness was significantly lower at the high school level than at the college level. Roblyer et al. (1988) also found higher effect sizes at the college level. Thus, for the present study, educational

level appears to make little if any contribution to a better understanding of CAI's effectiveness.

Studies were categorized into either military or civilian settings. There was no significant difference in effectiveness between CAI implemented in the military and civilian settings. Although Fletcher (1990) conducted a meta-analysis of the effectiveness of computer-controlled interactive videodisc instruction at the higher education, industrial training, and military training levels, he did not report whether the obtained effect sizes were significantly different. Therefore no comparison could be made between Fletcher's study and the finding of this study.

Discussion and Implications

Given the small difference in learning achievement between computer-assisted instruction and traditional instruction, is it worth implementing CAI? The answer to this question must be tied to the cost of implementing CAI in terms of cost-effectiveness and cost-efficiency. One way of determining cost-effectiveness is by comparing the costs of CAI and traditional instruction to accomplish a given level of achievement. The least expensive method that produces the prescribed level of achievement is the more cost-effective method. Apart from effectiveness, the question of efficiency is also important when comparing CAI and traditional instruction. The amount of effort and time required to implement CAI as compared to traditional instruction needs to be justified. Also important is the amount of savings in training time by using the different teaching methods. However, for training that involves safety of trainees and equipment, high costs of CAI may be easier to justify. If the safety or life of a person using real equipment for training (e.g., aircraft) is in danger, the choice of CAI over conventional training is obvious.

A critical element of this meta-analysis was the identification of suitable studies from abstracts accessed through computer searches. Although combinations of keywords are powerful, the searches may have missed a certain number of pertinent studies. Such a problem is not unique to this study. Difficulties with locating and accessing studies will be an ever present limitation in meta-analyses.

The results of this research were also dependent on the studies selected. Several factors related to the reporting of studies might have affected the results. Unreported data presented a problem in this meta-analysis. Attempts to retrieve these data from study authors proved futile. In certain studies, data were available but not in a form that was suitable for the calculation of effect sizes. Authors of studies are strongly encouraged to include summary statistics such as means, standard deviations, and t and F values in their reports and articles so these statistics may be used for future meta-analyses.

As indicated in the study results, computer-assisted instruction has great potential for use in higher order learning. Personnel in the field of technical education and training

should not disregard the demands of contemporary and future workplaces. When teaching higher order thinking to students, various means should be used, including computer-assisted instruction. Areas where the computer would have an advantage over real equipment in providing opportunities for students to learn complex skills should be given top priority.

It was shown from studies used in this meta-analysis that the effectiveness of computer-assisted instruction was frequently investigated in teaching diagnostic problem solving including troubleshooting. The use of computer-assisted instruction is well suited to the teaching of diagnostic problem solving because of the practice opportunities provided by the computer that are difficult to obtain through real equipment. One type of computer-assisted instruction that has shown promise in teaching diagnostic problem solving was Intelligent CAI. Most of the Intelligent CAI programs for troubleshooting have been implemented in the military. To take full advantage of this educational technology, ICAI technology should be diffused into the civilian sector. Joint efforts are needed between the military and civilian sectors to make this technology diffusion possible. Students at the postsecondary level who seek immediate employment upon graduation should be the initial targets for this cooperation. A successful example of such cooperation was shown in the diffusion of the Internet from the military to the civilian sector.

A barrier to the implementation of computer-assisted instruction in the civilian sector is the lack of expertise among instructors to develop these programs. Purchasing commercial software may not be the best solution since it may not suit the learning experience that was targeted. However, authoring programs that allow instructors to use windows-based menus to design CAI programs are now available. Given the proper training, instructors can develop sophisticated CAI programs that meet their needs.

The preceding is concerned with software aspects of CAI. Also of paramount importance are the learning principles underlying CAI programs. Efforts must continue developing CAI programs that apply such techniques as Cognitive Task Analysis, especially for highly specialized skills (e.g., troubleshooting complex equipment).

Meta-analysis has been shown to be useful in integrating findings from the literature on a particular topic. However, researchers who use meta-analysis should be selective when including studies for their analysis. It is better to include fewer studies that address the same topic than to use a large number of studies having different foci.

Although random assignment is central to sound experimental designs, it is not easy to implement in practice. Class schedules, time constraints, and availability of equipment are barriers to the use of random assignment. However, researchers can be encouraged by the findings of this study and other studies. The use of intact classes can be a reasonable alternative to random assignment, provided preexisting differences between groups are accounted for through statistical analysis.

Inadequacy of data is a major problem for research that uses meta-analysis. Authors of studies should note that results of their studies may be shared with the research community at large, and should thus make every effort to ensure that summary statistics are reported.

Another area that should be investigated is from a more comprehensive frame of reference i.e., cost-effectiveness. Schools and other educational institutions are constrained by financial budgets. The effectiveness of CAI may not be enough to persuade these educational entities to implement CAI. They need information such as the CAI cost per student that will be needed to increase achievement by a certain amount.

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ATTITUDES OF VOCATIONAL EDUCATORS TOWARD CHANGE

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Evidence has been provided by many researchers (e.g. O'Reilly, Asche, and Rowland, 1995) that change in vocational education is needed. A contributor to this need for change is the potential for current educational reforms have for minimizing the role of vocational education if vocational educators fail to meet the challenges that these reforms provide. Failure to make needed changes may result in vocational education being reformed rather than being a participant in the change process (Asche, 1991). The evidence indicates that vocational educators are not involved in a majority of the reform efforts (Lynch, 1996). Lynch notes that vocational educators need to be "a partner in these reform efforts--not apart from them" (p.24).

Given the decline in the secondary school students' vocational course taking which is down 17 percent in the decade from 1982-1992 while the Academic course taking is up by 22 percent (U.S. DOE, 1992), the urgency seems apparent. However, despite research showing that innovations that have been adopted have achieved the desired increases in student performances, Miller (1997 indicates that educators are still reluctant to fully adopt proven innovations. A contributor to this reluctance to change may be the lack of support from school and vocational leaders. Benjamin and Gard (1993) note that "for change to occur, school leaders must first believe that change is possible" (p.63). Murphy and Lick (1998) indicate that a change sponsor is a required role that must be played by a person who is in the position which "has the power to sanction or legitimize the change" (p.30) if change is to occur at reasonable pace. That is, without the support of a change sponsor, the change agent will have difficulty implementing desired changes. This observation was also made by Finch, Schmidt, and Moore (1996) who noted that educational administrators, counselors and business personnel were involved in establishing successful school to work activities.

Earlier research has indicated that Florida vocational educators responded favorably toward change and had positive attitudes toward innovation (Carr, 1984). Carr also found that vocational educators considered themselves to be flexible and able to adapt to change. In addition, Slaugh (1983) found that vocational business educators perceived few barriers to the implementation of an innovative curriculum approach. Recent research shows that vocational educators are able to change and develop innovative programs (e.g. Grummon, 1994) and have a positive attitude toward program improvement (Greenan, Wu, Mustapha, and Neube, 1998).

In contrast, however, is the implication that vocational educators are resistant to change and start every response to questions about change with the statement "in 1917...." (Asche, 1991). Even vocational educators who purport to have positive attitudes toward

program improvement, report that a major barrier to change is "negative teacher attitudes" (Greenan et.al., 1998). This indication of a negative attitude on the part of vocational educators and the reported negative image held by leaders of the new school reform movement have of secondary vocational education (Carti, 1998) lead this researcher to question what the perception of the administrators who are potential change sponsors was of the vocational educators on their district and school building regarding the willingness of vocational educators to plan, implement, and maintain innovative programs.

Objectives/Purpose

The purpose of this study was to determine whether there was a difference between the perceptions of district vocational directors and high school building administrators concerning the willingness of vocational educators to make changes in their programs. Specifically, the differences were sought between the ratings of these two administrative groups on (1) the extent to which selected innovations had been adopted, (2) planning strategies used by vocational educators, (3) implementation practices used when adopting innovations, (4) strategies employed to maintain innovative programs, and (5) general attitudes toward making programmatic changes. The level of the attitude toward change that these vocational educators were perceived to have by the identified administrative groups was also noted.

Conceptual Framework

The conceptual framework for this study is based on the theories/models of change. Change, it is hypothesized, is a process (Murphy & Lick, 1997) that occurs in stages (Hall et al, 1991) which individuals may resist (Conner, 1993). Murphy and Lick (1997) contend that change cannot occur without education. However, it seems logical to assume that learning does not occur without the predisposition or appropriate attitude toward learning. Thus the model developed for change that guided this research is shown in Figure 1.

Figure 1. Model of the Change Process

The stage of change indicated as being "Attitude toward Change" is envisioned as one's attitude in regard to making changes in what one does. While it is assumed that individuals have varying resistance to different changes, it is also evident that individuals have a general attitude toward making changes. This stage is most closely related to Conner's (1992) "Present State" phase of change. The second stage in the model that guided this study, "Planning for Change", is an aspect of Conner's "Transition State" in that a transition is not likely to occur if a plan is not developed. In addition, this stage implies that those who are making the change are also the ones who are making the plans to change. Murphy and Lick (1998) indicate that participation in planning for change provides the knowledge about the change needed to facilitate making the change.

Following the planning stage is the "Implementation of Change" which is the balance of Conner's (1992) "Transition State" and includes those activities necessary to implement the plans for the change. In order for change to occur, the activities included in the plan developed for the implementation of the change must be conducted. The final stage in the current model is the "Maintaining Change" stage. As reflected in the label for this stage, it is not assumed that a change will, once implemented, remain in place without effort on the part of those involved. It is assumed that a definite "change back" pressure will exist. Thus the terminology of "Desired State" employed by Conner for his final stage was rejected for a more active dimension which reflects the level of effort required to keep a change in place until it is institutionalized or is replaced by a better process. It should also be noted that the model includes a feedback loop that implies that the process can revert back to an earlier stage if the there is a problem in the smooth transition from one stage to another. For example it may be necessary to revert to a discussion of attitudes toward change if the strategies designed for implementing the change is in disagreement with the thoughts of the participants in the change process.

Methods

The method chosen for this study was a mailed survey to the identified administrative groups. This design was consider to be the optimal method to obtain responses from a large number of respondents at a minimum cost. A discussion of the subjects , instruments, data collection strategies, and analysis are resented in the following paragraphs.

Subjects

The subjects identified to participate in the study were the 67 district directors of vocational education and the 431 high school principals in the 67 Florida school districts. Of this population, 336 responded which included 60 of the 67 district vocational directors and 276 high school principals. Ten building principals indicated that the survey was inappropriate for their school because of the specific nature of the school including not starting classes in a new school designated to open in the fall of 1997. Thus a return rate of 68.8 percent was obtained. This return rate was considered exceptional given that the data were collected near the end of the school year.

Instrumentation

The instrument was designed in two parts. First the listing of innovative instructional strategies and innovative program initiatives were listed. Items written to reflect each of the dimensions in the model described in the conceptual framework were included in the second part. The instructional strategies were the seven innovations that members of the Florida Department of Education (FDOE) agreed were those that were being promoted for adoption in Florida high schools. Similarly, the six items included in the innovative program initiatives were those programs that the selected FDOE staff members agreed were the programs that they were suggesting that Florida high school vocational educators should consider adopting. The four point response scale for the first part of the instrument was a rating of the extent to which the respondents considered the vocational educators in their school or district had adopted the instructional or program strategy which ranged from no action (1)to fully implemented (4). Validity of these items is based on the agreement that these were the strategies that were being promulgated to the vocational educators in Florida high schools. It was felt to be important to get the terminology of these strategies exactly as that used by the promulgators of these strategies. Thus the program specialists who were in charge in the FDOE were the ones contacted to provide this information. A reliability estimate was not calculated for these items because no summative score was anticipated. Rather, if the two groups of administrators were in close agreement as to the programs/strategies that were implemented in their districts then it would be considered that the items were a reasonable estimate of the extent to which innovation or instructional strategy had been implemented. As will be noted in the results section, there was high agreement between these two administrative groups. A test-retest reliability would be appropriate for future development of the instrument.

The items for the second part of the instrument were based on the dimensions of the Attitude Toward Change (ATC) construct described in the conceptual framework. The general attitude toward change scale or the predisposition toward change contains 10 items while the attitude toward planning strategies, the attitude toward implementation strategies, and the attitude toward strategies for maintaining innovations include 10, 5, and 5 items respectively. Validity of the scales designed to measure these dimensions was established by first defining the dimensions in the conceptual framework based on the literature and then writing items to reflect the dimensions. A factor analysis of the data collected in this study gave partial support for construct validity of the scales. The factor analysis produced four factors with eigen values equal to or greater than one, which was the number of dimensions anticipated. However, the planning and implementation scales factored out in one factor and two negative items from the planning dimension formed a separate factor. For the purposes of this study, the items were scored as per the original dimensions. This decision was based on the opinion of the researcher that the planning and implementation items were likely to be seen on the same continuum by the respondents but that it would be useful to look at two aspects of this dimension.

Reliability estimates of the scales was considered to be high ranging from .89 to .91 with the estimates being .91 for predisposition toward change, .91 for planning attitudes, .91 for implementation, and .89 for attitudes toward maintaining innovations.

Data Collection and Analysis

A mailed survey was employed to collect the data from the vocational directors and principals included in the population. A cover letter explaining the purpose of the research, asking for the cooperation of the identified administrators, and assuring the respondents of anonymity was mailed with a pre-addressed return envelope. A follow-up mailing which included a follow-up letter and all of the material included with the first mailing was mailed to the nonrespondents two weeks after the original mailing. The goal of receiving a 70 percent response rate was nearly obtained on the second mailing.

The data were prepared for analysis by calculating a mean for the principal groups for each district for which a response was received from the vocational director. This was done to preclude the excessive weighting of large districts in comparison to small districts with the awareness that the reliability of the principal group would be increased for the counties where there were a higher number of these administrators. This technique reduced the number of districts that had complete data to the number of responding vocational directors. Thus the data for the analysis was from the 60 responding directors and the means of the responses from the principals from each of the 60 districts represented by the responding directors. The absence of data from principals from three of the districts represented by vocational directors reduced the number of districts represented to 57.

Data analysis was accomplished using a t-test to determine whether there was a significant difference between the mean ratings given to the vocational educators by the vocational directors and the principals of the high schools where the programs were housed. The means for each item on the instrument as well as the means for each scale score was explored to determine the level of the adoption of the innovation or the extent to which the respondent groups reported that vocational educators had positive or negative attitudes toward change.

Results

The administrative groups were in close agreement on the extent to which the instructional strategies had been implemented. A significant difference was obtained between the means for only one of the seven strategies listed. As shown in Table 1, the vocational directors rated the strategy of Creative Scheduling (block scheduling) higher ($t=2.46$, $p=.02$) than did the principal group. This indicates the vocational directors considered this strategy as being between implementation and fully implemented (3.30) while the principals mean rating was at the implementation stage (2.97). The means for both groups was at the implementation stage for Integration of Academic and Vocational Coursework, Strategies for Using Student Career and Education Planning Systems, and Expansion of Vocational Programs for Grades 9-12. The administrative groups were in agreement that the vocational educators were between the planning stage and implementation for Alternative Assessment ($X = 2.45$ for vocational directors and 2.42 for principals). The mean ratings for the strategies of Creative Scheduling and Applied Academics were between the implementation stage and the fully implemented for each

administrative group. It is apparent that these administrative groups are equally aware of the stage of implementation in which vocational educators are and that the vocational educators in Florida were making substantial progress toward the implementation of the strategies for instruction that the FDOE were suggesting.

Table 1
Stage of development of innovative instructional strategies by vocational educators

Instructional strategy	Vocational Directors		Principal		t	p
	Mean	SD	Mean	SD		
1. Integration of academic and vocational course work	2.98	.59	2.92	.56	.58	.56
2. Applied Academics	3.25	.61	3.12	.71	1.06	.29
3. Alternative assessment	2.45	.81	2.42	.79	.17	.87
4. Block scheduling	3.35	.81	2.97	.84	2.46	.02
5. Innovative teaching styles directed toward learning styles	2.82	.76	2.82	.76	0.00	1.00
6. Strategies for using student career and educational planning systems	3.05	.74	2.99	.61	.48	.63
7. Expansion of vocational programs for grades 9-12	3.07	1.03	2.98	.79	.52	.60

As shown in Table 2, significant differences ($p<.01$) were observed between the two administrative groups for two of the six State Initiatives. The two were Blueprint for Career Preparation and Gold Seal Endorsement and Scholarship Program which are programs that have been in place the longest period of time. The Vocational Directors mean ratings were higher than the Principals for both of these variables were. The Vocational directors' mean rating for these two programs was 3.64 and 4.00 respectively while the Principals' mean ratings were 3.26 and 3.83. Thus the Vocational Directors considered these programs to be nearer to the fully implemented stage than did the Principals. The likely reason for the difference in the perception of the implementation stage for these two programs is that most of the Vocational Directors could point to at least one program in their district that was fully implemented while the individual building Principal was more likely to have a program that was not fully implemented.

The Vocational Directors (3.68) and Principals (3.52) agreed that the Tech Prep programs in their district/school were between the implementation stage and being fully implemented and that the Work Place Programs were at the implementation stage with the means for the latter being 2.85 for Vocational Directors and 2.72 for Principals. These administrative groups also agreed the Centers of Emphasis and Apprenticeship programs were in the planning stage of implementation.

Table 2
Stage of development of the state suggested program initiatives

Program/Initiative	Vocational Directors		Principals		t	p
	Mean	SD	Mean	SD		
1. Blueprint for Career Preparation	3.64	.62	3.26	.64	3.23	.002
2. Gold Seal Endorsement and Scholarship	4.00	.00	3.83	.37	3.43	.001
3. Tech Prep	3.68	.51	3.52	.50	1.67	.097
4. Centers of Emphasis	2.18	1.32	1.86	.68	1.60	.112
5. Apprenticeships	2.19	1.12	2.35	.90	.82	.415
6. Workplace Education programs	2.85	.83	2.72	.72	.95	.345

Mean differences were observed for six (or 7) of the ten items on the general attitude toward change scale as well as for the total scale score. It is important to note that the rating scale for the negative items has been reversed and that the score of one is the highest score. In addition, the data for the total score was an average of the item scores. In general, the Principal group rated the vocational educators in their district as having a more positive attitude toward change than did the Vocational Director group for each of the mean differences that were found to be significant. It may be observed in Table 2 that the differences between the means for these items ranged from one-fourth to two-thirds of a scale point. The largest mean difference was observed for the item "Resist changes in their programs" with the means being 2.79 for Vocational Directors and 2.12 for the Principal group. In words, the Principals mean rating was near the "disagree" point on the scale whereas the mean for the Vocational Directors was near the "neutral" point on the scale. A similar pattern was observed for item 5, "Make changes only when they think it is necessary for survival" where a one-half scale point mean difference was obtained. The Principal group rated this item as being near the agree point (2.23) on the response scale while the Vocational Directors rated them as being nearer to neutral (2.72). A positive item which was the reverse of item 1, i.e. item 8 "Have a positive attitude toward making needed changes", was also rated in a similar manner giving credence to the ratings given by these groups. The means for this item, which were significantly different ($p < .01$), were

2.01 (agree) for the Principal group and 2.46 (near the midpoint between agree and neutral) for the Vocational Director group.

The mean ratings given by the Vocational Directors and Principals for the total scale score for the general attitude toward change was observed to be significantly ($p<.01$) different. The means for these groups were 2.65 and 2.28, respectively In general, the Principals in the buildings in which the vocational educators were employed rated the vocational educators more positively on the general attitude toward change than did the Vocational Directors from his/her position in the district office. However, it should be noted that the means for the general attitude scale were on the positive end of the scale for both groups.

As shown in Table 4, significant differences between the means for the Vocational Director and Principal groups were observed for eight of the ten items in the planning for implementation dimension as well as for the total scale score. These mean differences range from two-thirds of a scale point to one-forth of a scale point with the Principal group giving the more positive response for each of the items for which differences were observed. The two items for which there was a mean difference of approximately two-thirds of a scale point were "identify new groups of clients for their programs" ($p<.01$) and "implement new programs without sufficient planning"($p<.01$). Items for which a mean difference of approximately one-third of a scale point difference was observed included "assume responsibility for the development of plans for changing their programs"($p<.01$), "rarely plan ahead for needed changes"($p<.01$), "collect information to determine needs for new programs" ($p<.05$), set timetable for implementing new programs or strategies"($p<.05$) and the "total scale score for planning for implementation". The remaining two significant items, "assume responsibility for specific tasks required to implement change"($p<.05$) and "develop plans for implementing new programs or strategies"($p<.05$) had a mean difference for the two administrative groups of approximately one-forth of a scale point.

The item for which both groups were the most positive was "assume responsibility for specific tasks required to implement change" with the means for the Vocational Director and Principal groups being 2.02 and 1.78 respectively. The Principal group gave positive responses for all items in this scale with the means ranging from 1.78 (just below agree for positive items) to 2.15 (just above agree for positive items). The Vocational Directors rated the items of "identify new groups of clients for their programs"($m=2.55$), implement new programs without sufficient Planning" ($m=2.48$), and "set timetables for implementing new programs or strategies" ($m=2.45$) near the midpoint between agree and neutral on the response scale thus presenting less than a totally positive perception of vocational educators for these three items.

Both groups expressed a positive perception of the vocational educators behavior for the two non-significant items, "seek feedback to determine progress" and "network with colleagues at other schools to learn about new programs" The means for these two items for Vocational Directors were 2.18 and 2.11 respectively while the means for the Principal group were 1.88 and 2.13 respectively.

Table 3
Comparison of general attitude toward change means for Vocational Directors and Principals

Item	Vocational Directors		Principals		t	p
	Mean	SD	Mean	SD		
1. Resist needed changes in their programs	2.79	.98	2.12	.57	4.47	.000
2. Keep current on the latest innovation in their program areas	2.42	.78	2.14	.539	2.25	.026
3. Want their programs to be up-to-date	1.82	.54	1.68	.48	1.49	.138
4. Seek input from business and industry representatives to determine needed changes in their programs	2.32	.85	2.19	.72	.84	.405
5. Make changes only when they think it necessary for survival	2.72	.99	2.23	.62	3.16	.002
6. Only make changes that are mandated by the Department of Education	2.40	.96	2.22	.71	1.19	.237
7. Rely on administrators to suggest needed changes	3.02	.99	2.58	.77	2.64	.009
8. Have a positive attitude toward making needed changes	2.46	.71	2.01	.43	4.09	.000
9. Have a system in place for continual improvement of their programs	2.75	.87	2.16	.55	4.37	.000
10. Are more comfortable with slow, gradual change	3.81	.83	3.47	.64	2.43	.017
Total Scale	2.65	.59	2.28	.44	3.78	.000

Table 4
Comparison of means of the perceptions of the behaviors concerning the planning for the implementation of change given to vocational educators by Vocational Directors and Principals

Item	Vocational Directors		Principals		t	p
	Mean	SD	Mean	SD		
1. Collect information to determine needs for new programs	2.18	.81	1.85	.64	2.38	.19
2. Assume responsibility for specific task required to implement change	2.02	.65	1.78	.49	2.17	.033
3. Seek feedback to determine progress	2.18	.83	1.88	.67	2.11	.141
4. Assume responsibility for the development of plans for changing their programs	2.32	.88	1.88	.48	3.30	.001
5. Rarely plan ahead for needed changes	2.25	.92	1.87	.45	2.79	.006
6. Implement new programs without sufficient planning	2.48	.89	1.86	.58	4.36	.000
7. Identify new groups of clients for their programs	2.55	.78	2.15	.52	3.21	.002
8. Network with colleagues at other schools to learn about new programs	2.11	.68	2.13	.66	-.21	.835
9. Develop plans for implementing new programs or strategies	2.18	.69	1.95	.54	1.98	.050
10. Set timetable for implementing new programs or strategies	2.45	.83	2.13	.58	2.36	.020
Total planning scale score	2.25	.58	1.93	.44	3.32	.001

Both the Vocational Directors and the Principals reported that the vocational educators exhibited behaviors that indicate their willingness to implement changes in their programs. The item means, shown Table 5, for the Principal group ranged from 1.84 to 2.19 for the five items representing this scale. These means represent scores that are near the agree (2.00) point on the scale. The Vocational Director group means for these items

ranged from 2.16 to 2.52 or just above the agree point on the scale up to the midpoint between agree and neutral. Similar to other scales, the means for the two administrative groups were significantly different for four of the five items at the .01 level of significance. Three of these items, "systematically take action to implement change", "seek information to determine progress in implementing changes", and "assume responsibility for specific tasks required to implement the change" had a mean difference between the two administrative groups of approximately one-third of a scale point. The fourth significant item had a difference between the means of these groups of one-fifth of a scale point. It follows then that the total score mean fell between these two with the mean difference being approximately one-forth of a scale point. The significance level of the difference between the administrative groups for the total score for implementation was .05.

It is evident from these data that both administrative groups perceive that vocational educators exhibit behaviors that indicate that they do in fact systematically go about making changes in their programs. They accept the necessary task willingly and seek feedback as well as make changes needed to successfully make the desired changes.

Table 5
Comparison of attitude toward implementing new program or instructional strategies means for `Vocational Directors and Principals

Item	Vocational Directors		Principals		t	p
	Mean	SD	Mean	SD		
1. Systematically take action to implement the change	2.32	.72	1.98	.53	2.86	.005
2. Assume responsibility for specific tasks required to implement the change	2.16	.71	1.84	.42	2.96	.004
3. Seek feedback to determine progress	2.52	.83	2.19	.57	2.61	.010
4. Demonstrate acceptance of changes being made	2.39	.76	2.09	.39	2.72	.007
5. Make midcourse corrections in the implementation of the change	2.32	.79	2.14	.51	1.44	.152
Total score for implementation	2.31	.72	2.05	.38	2.39	.019

It is obvious from the means and standard deviations that some of the ratings given by individual respondents were not positive. However, taken as a group, the vocational educators were perceived to exhibit positive behaviors toward making changes in their

programs. The next section presents the perceptions of these two administrative groups concerning the willingness of vocational educators to maintain changes that are made.

As may be observed in Table 6, there were more similarities than differences between the two administrative group's ratings of the vocational educators' attitude toward the maintenance of changes made in their programs. Significant differences ($p<.05$) were observed between the means of the administrative groups for the items "Demonstrates the willingness to sustain the change" and "Promotes the program as changed to potential students." The means of these items were approximately one-fourth of a scale point different. In addition, the means for the groups on the total score was significantly different for the two groups ($p<.01$) with the means being approximately one-fourth of a scale point different. In each of the observed differences, the building principals rated the vocational educators in their districts as being more willing to maintain the changes that had been made than did the vocational directors. It is interesting to note that the means of the items for both groups are near the agree point on the scale which would indicate a perception that the vocational educators were interested in maintaining changes that had been made whereas the means for the one negative item, "Demonstrate an interest in returning the program back to its previous structure," is about midway on the scale between agree and neutral. Thus it appears that these vocational educators are perceived to working to maintain changes made while entertaining the idea of changing back to the former structure.

Table 6
Comparison of attitude toward maintenance of change means for Vocational Directors and Principal

Item	Vocational Directors Mean	SD	Principals Mean	SD	t	p
1. Demonstrate the willingness to sustain the change	2.13	.57	1.86	.45	2.73	.007
2. Make changes in their behavior to accommodate the change in program	2.12	.59	2.01	.48	2.05	.101
3. Demonstrate an interest in returning the program back to its previous structure	2.39	.71	2.35	.67	.30	.766
4. Work to keep and improve the program in its new form	2.16	.65	1.97	.48	1.74	.085
5. Promote the program as changed to potential students	2.09	.58	1.87	.47	2.20	.030
Total score for maintenance of change	2.25	.55	1.97	.40	3.11	.002

Conclusions

The data indicate that both administrative groups you would be the ones to provide the sponsorship of changes in vocational education programs believe that the vocational educators have a positive attitude toward change and have made substantial progress in implementing changes that have been promoted by the Florida Department of Education. Thus, in contrast to the common wisdom that vocational educators begin every sentence about change in programs with "in 1917" indicating their unwillingness to change, it appears that those in positions of authority in close proximity to these educators believe that they are making changes in their programs in a attempt to keep their programs current and have a positive attitude toward making and maintaining changes in their programs. More specifically, the closer to the administrator is to the vocational educator in their day to day work, the more positive perception they have. While it would seem that a Director of Vocational Education would work more closely with the vocational educators than would the Principals, this is not the case. The day to day supervision of the instruction delivered by the vocational educators is the responsibility of the Principal while the Vocational Director is a district level position who does not have direct supervisory responsibility.

A close look at the data reveals that, while the Vocational Directors and Principals agree on the extent to which various programs and strategies for instruction have been implemented in their schools, they disagree on many of the items regarding the willingness of vocational educators to plan, implement, and maintain changes in their programs. While the mean scores indicate a positive perception of the vocational educators attitude in these areas, the Principal group consistently rates the vocational educators as having a more positive attitude than does the Vocational Director group. Both of these administrative groups see vocational educators as having a positive attitude toward planning for change implementing change and maintaining programs after changes have been made with the Principal group being more positive than the Vocational Director group. This raises the question of whether vocational educators are more critical of other vocational educators than are non-vocational administrators. It follows then that the image that the general public has of vocational educators as being out of date and not wanting to change could be a result of this internal criticism.

Given the earlier evidence that vocational educators indicate a willingness to change their programs (Carr, 1984) and the perceptions of administrators that vocational educators have a positive attitude toward planning for change, implementing change and maintaining changes once they have been implemented, the question that seems most apparent is what is the source of the "image problem" (Catri, 1998) that vocational education appears to have. It also raises the issue of what changes vocational educators should be making and who should be determining what these changes should be. If vocational educators are making the changes that are suggested by the state DOE then one should be assured that the programs are keeping up to date. It is suggested that a study be done to answer the question as to whether vocational programs are up to date and whether appropriate research is being conducted to determine what changes need to be made in the programs.

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